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CACTUS AND SUCCULENT JOURNAL

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Vol. XXIV NOV.-DEC., 1952 No. 6

FIG. 108. A frayed Arizona Giant, see next page.

CACTUS AND SUCCULENT JOURNAL

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CACTUS AND SUCCULENT SOCIETY CONVENTION
Denver, July, 1951

Sister Marie Fidelis, I.H.M. reports the field trip in *The Asa Gray Bulletin:*

"On the last two days there were conducted field trips. The drive south from Denver through Colorado Springs en route to Cañon City was most picturesque. Those who know that scenic part of our country will understand what a joy it was to see it the first time. To those who have not had this great fortune, we would say simply that even the most brilliant pictures of it are no exaggeration. While they depict the beauty of the landscape, they do not capture the feeling of the overwhelming grandeur of the Rocky Mountain ranges, the canyons, the vast coniferous forests. The roadsides were studded with many showy flowers. One of the most common genera was *Penstemon*. It was interesting to notice that near Denver the flowers of Penstemon were deep pink, then there was a transition zone of pink and white ones, and in southern Colorado they were all pure white. There were *Yucca* lilies of all sizes. Near Denver they were in full bloom and farther south they were in fruit. There were literally fields of wild sun-flowers along the way which made a most attractive sight as they faced the bright Colorado sun. The white prickly poppy appeared as a weed in many places. The mountain meadows were veritable fairylands. The columbine, Colorado's state flower, was specially notable for its enormous size. The large forget-me-not plants were vastly different from our garden types.

"Our first cactus hunt was on Wakefield Ranch, a few miles from Cañon City. Oh, the thrill of seeing cacti in their natural habitat! There was *Opuntia arborescens* Engelmann. It is a cylindrical type, some plants about three to four feet high and several feet in diameter. Many of the plants, in full bloom, their rose-colored flowers with numerous yellow stamens, made a beautiful sight. *Opuntia polyacantha* Haworth, a flat-stemmed type, was plentiful too. This is rather low growing or procumbent, lying prostrate on the ground in many places, and making itself known to inexperienced collectors in other ways than by the display of its beautiful yellow flowers. *Opuntia phaeacantha* Engelmann and *Opuntia hystricina* Engelmann were found by different members of the group. The terrain was covered with shale, small and large boulders. It was most interesting to see the different kinds of lichens on these boulders. It was quite evident that a great work was done by these small plants in disintegrating the rocky masses. The only so-called trees of this region were juniper and arbor vitae about four or five feet high. Their gnarled trunks told the story of the many years they had struggled for existence.

"After visiting the Royal Gorge on the next day, we proceeded to the Wet Mountain Valley regions for more collecting. Here we found the smaller, globular types of cacti, namely, *Echinocereus triglochidiatus* Engelmann, *Echinocereus viridiflorus* Engelmann, *Pediocactus Simpsonii* (Englemann) Britton & Rose, *Sclerocactus Whipplei* (Engelmann & Bigelow) Britton & Rose, and *Coryphantha vivipara* (Nuttall) Britton & Rose. What an experience to find mounds of cacti on the sides of mountains! How amazingly some of them grew between the stones, their roots pressed practically paper thin! On the plateau portions, cacti were actually recessed in the ground, and since they are of the same color, they were very difficult to find. Finding cacti is only part of the feat of collecting. Digging, bagging and transporting them requires equal skill so that there will be no harm to either plants or collector."

NOTICE TO AFFILIATES

There are now two sets of 100—35-mm colored slides each available to affiliates. The first set is composed of California Cacti and the second of Baja, South America and Mexican plants. Any affiliate interested in borrowing either set may do so by sending me a $5.00 deposit.

MARY GLADE, *Corresponding Sec'y.*
7600 Verdugo Crestline Dr.
Tujunga, California.

NEW SOCIETY

The New Zealand Society has recently formed a new branch in Dunedin, Otago, with Thomas Marlowe as their first president.

COVER PHOTO

Charles Polaski, of Oklahoma, made this interesting photo in Arizona. Early books showed drawings of what they believed were live plants. This dead *Carnegiea gigantea* has exposed ribs which tend to become frayed by the weather.

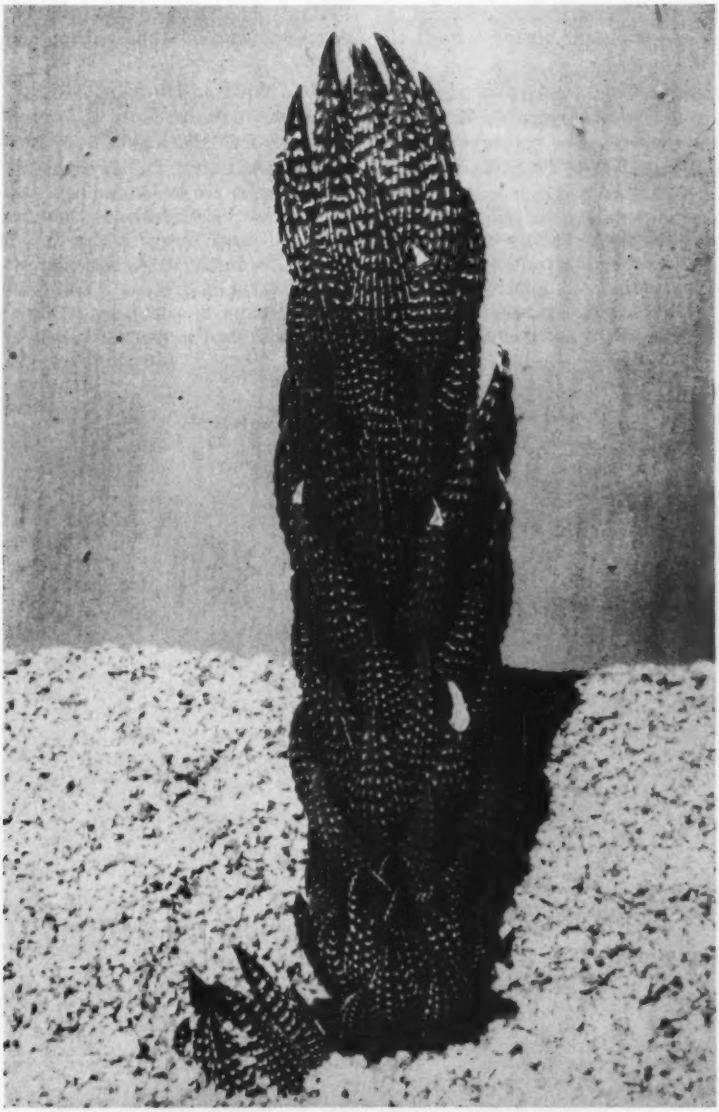


FIG. 109. *Haworthia Reinwardtii* var. *adelaidensis* Poelln. nat. size.

NOTES ON HAWORTHIAS

By J. R. BROWN

Haworthia Reinwardtii var. **adelaidensis** Poelln. in Beitrage zur Sukk. (1940)43; Resende in Mem. Soc. Brot. II (1943)80, fig. 32a.

Plant with leafy stems to 15 cm. or more in length, about 4 cm. diam., and proliferous from the base.

Leaves 3-4 cm. long, 10-12 mm. broad towards the base, ovate-lanceolate, acute, incurving, deep green; face of leaves smooth or with a few scattered whitish tubercles toward the tip; back rounded and with 9-11 rows of white tubercles, sometimes in irregular transverse rows but usually in lengthwise rows, the tubercles often

confluent in short lengthwise rows; keeled towards the tip and ending in a short subpellucid point.

Locality: Cape Province: Adelaide.

The photograph illustrating this Haworthia shows a plant received some years ago through the courtesy of Dr. Flavio Resende of Lisbon. There would seem to be some confusion regarding this plant as I have received plants wrongly under this name from So. Africa and showing no evidence of the tubercles on the back of the leaves being more or less confluent longitudinally, and for which especial reason this form of *Haw. Reinwardtii* was differentiated. Dr. von Poelln. (l.c.) states, "Höcker der Unterseite öfters zu kurzen Langsreihen zusammenfliessend."

G. G. Smith in Journ. So. Afr. Bot. X (1944) 17, in his notes re *Haw. Reinwardtii* var. *riebeekensis* mentions that this var. is nearest allied to var. *adelaidensis* but is a smaller plant and the tubercles are in longitudinal rows, whereas those of var. *adelaidensis* are in transverse rows. It would seem, however, that var. *adelaidensis* is probably better placed between var. *riebeekensis* and var. *kaffirdriftensis*. This latter form having the rows of tubercles much more united lengthwise than in the case of var. *adelaidensis*.

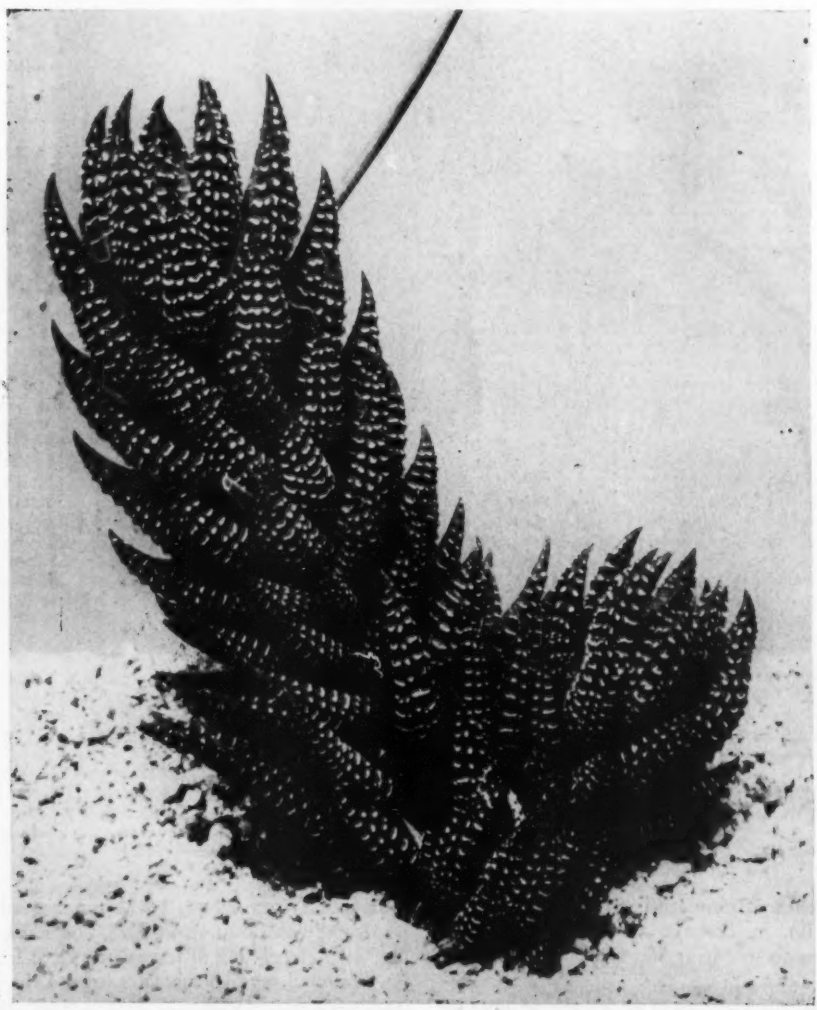


FIG. 110. *Haworthia Reinwardtii* var. *peddiensis* G. G. Smith nat. size.

Haworthia Reinwardtii var. **peddiensis** G. G. Smith in Journ. So. Afr. Bot. IX (1943) 94, pl. I and fig. 2.

Plant with erect, leafy stems to 13 cm. long and 4.5-5 cm. diam., proliferous from the base.

Leaves erect, incurving, to 3 cm. long, 12-13 mm. broad towards the base, ovate-lanceolate, face of leaves flat to lightly rounded, with fairly numerous small, white to concolorous tubercles in the upper half, usually in 3 more or less lengthwise rows; back rounded, dark green in color becoming brownish green in age, with 10-12 somewhat wavy transverse rows of usually roundish white tubercles, the tubercles on the somewhat oblique keel and some towards the margins transversely oblong and sometimes confluent; the transverse rows 1.5-2 mm. apart in the middle of the leaf; the tubercles also in 10-12 indistinct lengthwise rows.

Locality: Cape Province; Peddie Div., 12 miles east of Hunts Drift, Fish River.

An attractive form of *Haw. Reinwardtii*. Recently while looking at this plant it was noticed that due to the contraction of the leaves it was 4.5 cm. in diameter. This is just one instance of how the varying given diameters of Haworthias arise, expansion or contraction of the leaves due to growth conditions may alter measurements considerably.

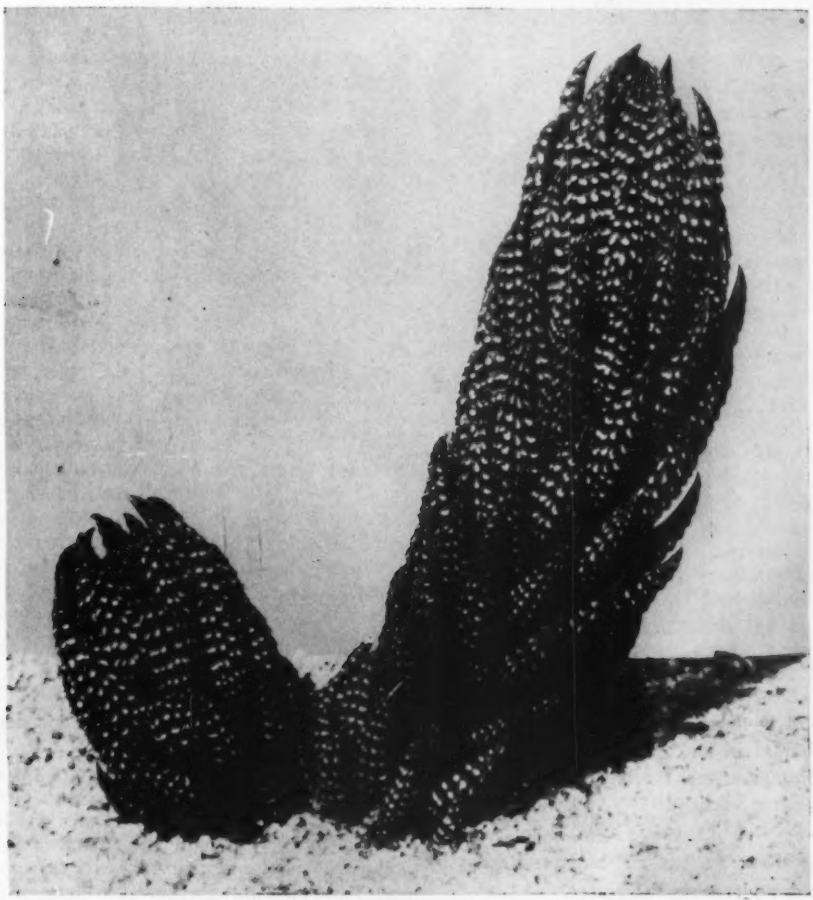


FIG. 111. *Haworthia Reinwardtii* var. *brevicula* G. G. Smith nat. size.

Haworthia Reinwardtii var. **brevicula** G. G. Smith in Journ. So. Afr.Bot. X (1944) 11, Pl. I and fig. 1.

Plant with leafy stems 8 cm. or more long, to 4 cm. diam., proliferous from the base.

Leaves ascending, incurving, to 3 cm. long, 8-10 mm. broad towards the base, ovate lanceolate; face of leaves somewhat rounded and with

some small white tubercles in 3-4 lengthwise rows in the upper half, the tubercles gradually becoming concolorous below; back rounded, dark green, with 12-13 more or less wavy transverse rows of round to reniform white tubercles to 1 mm. diam., those on the keel often somewhat transversely oblong; the transverse rows 1.5-2 mm. apart in the middle of the leaf; the tubercles also in 9 indistinct lengthwise rows.

Locality: Cape Province: Albany Div., near Fraser's Camp.

"*Haw. Reinwardtii* var. *brevicula* is a small variety limited in its distribution to Fraser's Camp, where it assumes several forms."

"A neat compact little plant and quite distinctive."

Some plants of this would seem to reach a greater length of stem than others. It is also noticed that some plants have leaves entirely smooth on the face. As the author states it is quite distinctive, more so than the photograph indicates. It seems to be much slower in growth than most of the forms of *Haw. Reinwardtii.*

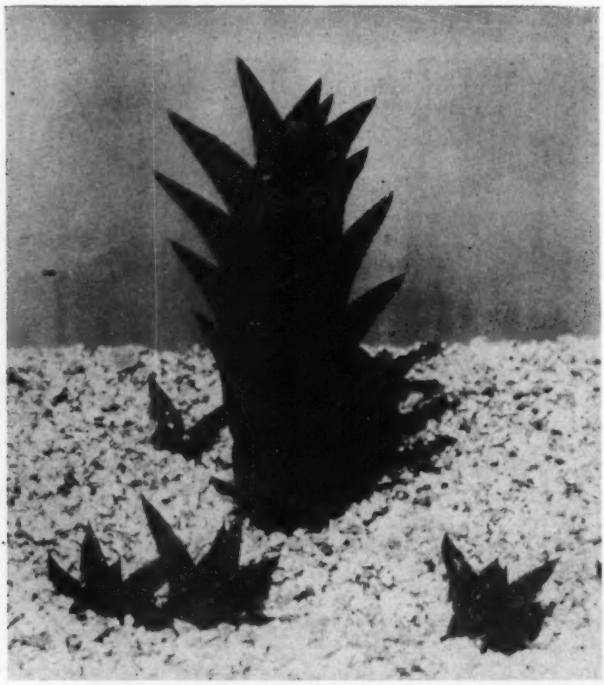


FIG. 112. *Haworthia nigra* var. *suberecta* (Poelln.) Uitewaal nat. size.

Haworthia nigra var. **suberecta** (Poelln.) Uitewaal in Succulenta (1948) 51. *Haw. Schmidtiana* var. *suberecta* Poelln. in Kakt. u. andere Sukk. (1937) 169, fig.; in Repert Sp. Nov. XLIV (1938) 205.

Plant about 7-8 cm. tall and proliferous by numerous underground rhizomes.

Leaves erect, often curved outwards in the upper part but not recurved, ovate-lanceolate, about 3 cm. long, to 2 cm. broad towards the base, keeled in the upper part and ending in a short subpellucid point.

Locality: Cape Province; 15 miles westerly of East London.

Slight variations occur in different plants of this form of *Haw. nigra.* Some plants growing a little taller than others, some with the leaves a little longer and more curved outwards, and others having somewhat narrower leaves. The color and markings are similar to those of *Haw. nigra* var. *Schmidtiana.*

Correction: The citation of the plate number of *Haworthia Reinwardtii* var. *zebrina,* in the previous issue of this Journal, should read Pl. II instead of Pl. 11.

NOTES ON NEOBUXBAUMIA

By E. YALE DAWSON

In company with Howard E. Gates the writer recently completed a trip through southern Mexico during the month of May. The season was that immediately preceding the summer rains, and most species of cacti were in preparatory flower and fruit. One of the aims of the trip was to recollect and observe the cereoid species which the writer had treated in 1948 and to preserve critical flower and fruit material for study.[1] Favorable conditions were found throughout Oaxaca, Puebla and Vera Cruz, and the following notes represent results with regard to one of the most interesting groups of the giant cacti.

Neobuxbaumia was described by Backeberg (1938) with the type species *Pilocereus tetetzo* Weber. At that time he included *N. polylopha* (DC) Backbg., and in 1941 added *N. mezcalaensis* (Bravo) Backbg. and *N. scoparia* (Poselg.) Backbg. The setting up of this genus can scarcely be considered a splitting of the genus *Cephalocereus* sensu Br. & R., 1920, for although three of the species were treated by those authors and placed in *Cephalocereus,* all of these were inadequately or incorrectly known as to flower and fruit.

Recent field observations (in part reported from the field, Dawson 1952) on four plants treated here as *Neobuxbaumia,* together with Poindexter's (1949) observations on *Pilocereus polylophus,* have, in the writer's opinion, demonstrated not only that these five species are all closely related, but that they represent a taxonomic group well set off from other members of the Nyctopachycerei, with the possible exception of *Carnegiea.* Some of the characters used by Backeberg in setting up the genus have been found incorrect or inapplicable to all of the species (succulent fruits; apical flowering). However, characters have now been observed, particularly those of the fruits, which are especially distinctive and uniform for the five species and their varieties and show this to be a closely knit group of plants. Inasmuch as Backeberg's knowledge of the type species was incomplete, the description of the genus may be modified and expanded according to the following diagnosis.

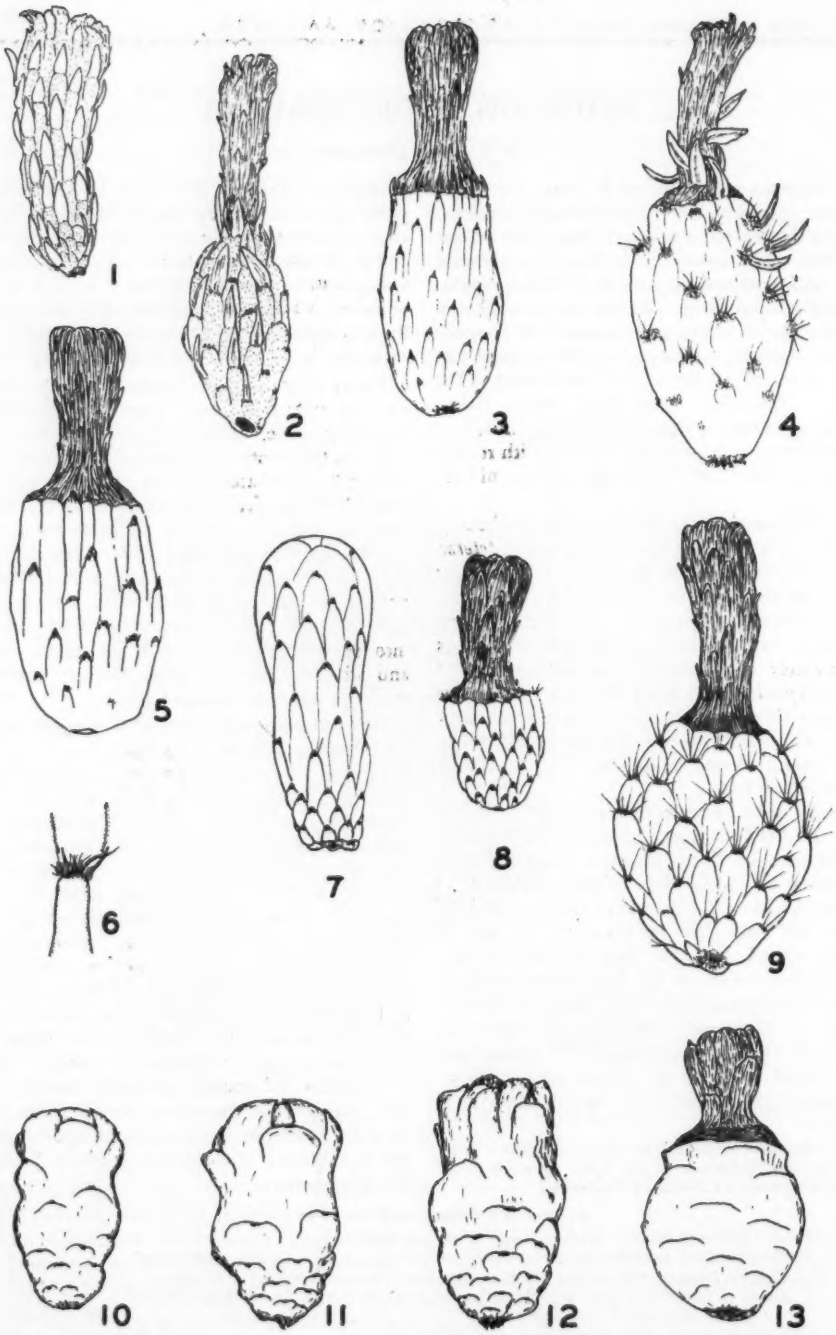
Plants large, simple or branched, with numerous low ribs; flowers not borne in a specialized flowering zone, nocturnal, cylindric-campanulate, the tube with fleshy scales which may have papery tips, the areoles nude or with occasional weak bristles; fruits greenish in color when mature, nude except for the scales, or the areoles slightly woolly and (or) with a few bristles, roughly ovate and 4 cm. long or less, with a non-juicy, white pulp, discharging the pulp by splitting of the mature ovary wall from the top into several segments which are white within and which spread and reflex so as to resemble flower petals from a distance.

It is interesting to note that *Carnegiea,* which long was considered monotypic, but to which Backeberg has recently added *C. euphorbioides,* shows many characters in common with *Neobuxbaumia* as here recognized. Possible significant differences occur in the long persistence of the open flowers during the day following anthesis, and the red color and relatively juicy character of the fruit-pulp. Were it not for the fact that the fruit characters of *Neobuxbaumia* ally the five species treated here so closely, and that all of them differ from *Carnegiea* in color and consistency of the pulp, one would easily be led to unite all of these plants under the earlier genus *Carnegiea.* Many conservative botanists would, of course, go much farther than that. However, at the present time it seems well, in order to emphasize the close relationships of the five species in question, to retain them in *Neobuxbaumia.*

[1] The material described or illustrated here is preserved in the Herbarium of the Allan Hancock Foundation, University of Southern California.

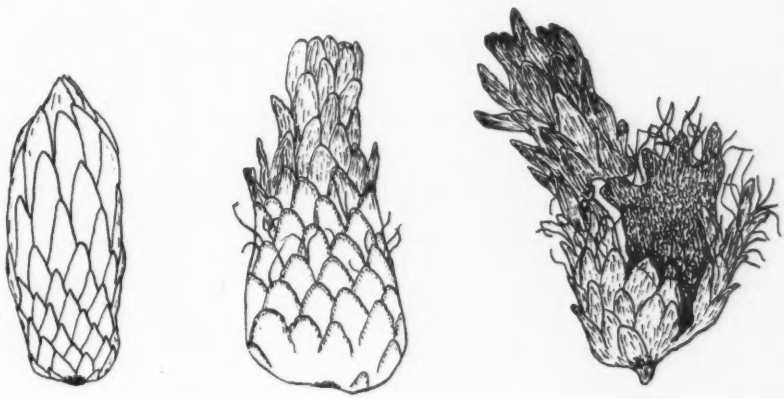
KEY TO THE SPECIES AND VARIETIES

1. Plants branched; flowers produced only at or near branch tips 2
1. Plants columnar, unbranched; flowers produced along the entire length of the stem 5
2. Plants columnar, with only a few branches; fruits with some wool or bristles 3
2. Plants of candelabra form with many branches; fruits completely without wool or spines throughout development ..... *N. scoparia*
3. Scales on ovary and fruit narrow, not overlapping ..... *N. tetetzo* . . . 4
3. Scales on ovary and fruit broad and overlapping ..... *N. macrocephala*
4. Spines few, usually one or three deflexed radials about 1.5 cm. long or less. *N. tetetzo* var. *nuda*
4. Spines numerous, 1-3 centrals and 8-12 radials, heavy in lower parts of plants ..... *N. tetetzo* var. *tetetzo*
5. Flowers greenish-white ..... *N. mezcalaensis* . . . 6
5. Flowers reddish to pink ..... *N. polylopha*
6. Areoles 1 cm. apart; ribs 1.2 cm. high ..... *N. mezcalaensis* var. *multiareolata*
6. Areoles 2 cm. apart; ribs to 2 cm. high ..... *N. mezcalaensis* var. *mezcalaensis*
6. Areoles 2.5 cm. apart; ribs to 2.5 cm. high ..... *N. mezcalaensis* var. *robusta*



(Jour. Fig. 113)

FIGS. 1-3 all natural size except fig. 6. FIG. 1. A closed flower of *N. tetetzo* var. *nuda* from the type locality 10 miles west of Tehuantepec. FIG. 2. Young fruit of *N. tetetzo* var. *tetetzo* from Km. 613, Rio Totolapan, Oaxaca. FIG. 3. Immature fruit of *N. tetetzo* var. *tetetzo* from near Totolapan, Oaxaca. FIG. 4. Mature fruit of the same. FIG. 5. Mature fruit of *N. tetetzo* var. *tetetzo* from near Zapotitlán, Puebla. FIG. 6. Detail of lower areole of the fruit in fig. 5 showing sparse wool and small bristles. FIG. 7. Nearly mature flower bud of *N. mezcalaensis* from 11 miles southwest of Zapotitlán, Puebla. FIG. 8. Young fruit of same. FIG. 9. Mature fruit of same. FIG. 10. Flower bud of *N. scoparia* from near Puente Nacional, Vera Cruz. FIG. 11. Mature flower bud of same. FIG. 12. Young fruit of same. FIG. 13. Mature fruit of same.



(Jour. Fig. 114)
FIG. 14-16 all natural size. FIG. 14. Flower bud of *N. macrocephala* from 8 miles west of Zapotitlán, Puebla. FIG. 15. Nearly mature fruit of the same. FIG. 16. Old, splia pericarp of the same.

NEOBUXBAUMIA TETETZO (Weber) Backbg.

Pilocereus tetetzo Weber, in Schumann, 1897, p. 175.

This species was chosen by Backeberg as the type of his genus. The nomenclature surrounding the entity has been reviewed by the writer in another paper (Dawson, 1948, p. 6) where its occurrence in the Rio Totolapan area of Oaxaca was reported and some illustrations given. Recent observations on the flowers of the Rio Totolapan plants and of those of the plant described in the same paper as *Cephalocereus nudus* from near Tehuantepec, Oaxaca, have shown that these must be considered a single species. The flower tubes bear the same peculiar papery scale-tips as often occur on the large form of *N. tetetzo* which inhabits the canyons to the west at higher elevations. (Compare figs. 1 and 2.) The transfer, *Neobuxbaumia tetetzo* var. *nuda* (Dawson) comb. nov., is called for.

In the Rio Totolapan area two kinds of fruits occur on *N. tetetzo* plants. Some bear flowers with the scale-tips prolonged to thin, papery extensions several millimeters long (fig. 2). These may in part be retained on the ripening fruit (fig. 4). Other plants bear flowers much like those of *N. mezcalaensis* with very short, papery scale-tips and fruits with similar lack of scale modification (fig. 3). Observations to date have not explained these differences. The few fruits of *N. tetetzo* collected in the Zapotitlán, Puebla area were without the prolonged papery scale-tips (fig. 5).

NEOBUXBAUMIA MEZCALAENSIS (Bravo) Backbg.

Cephalocereus mezcalaensis Bravo, 1932, p. 379.

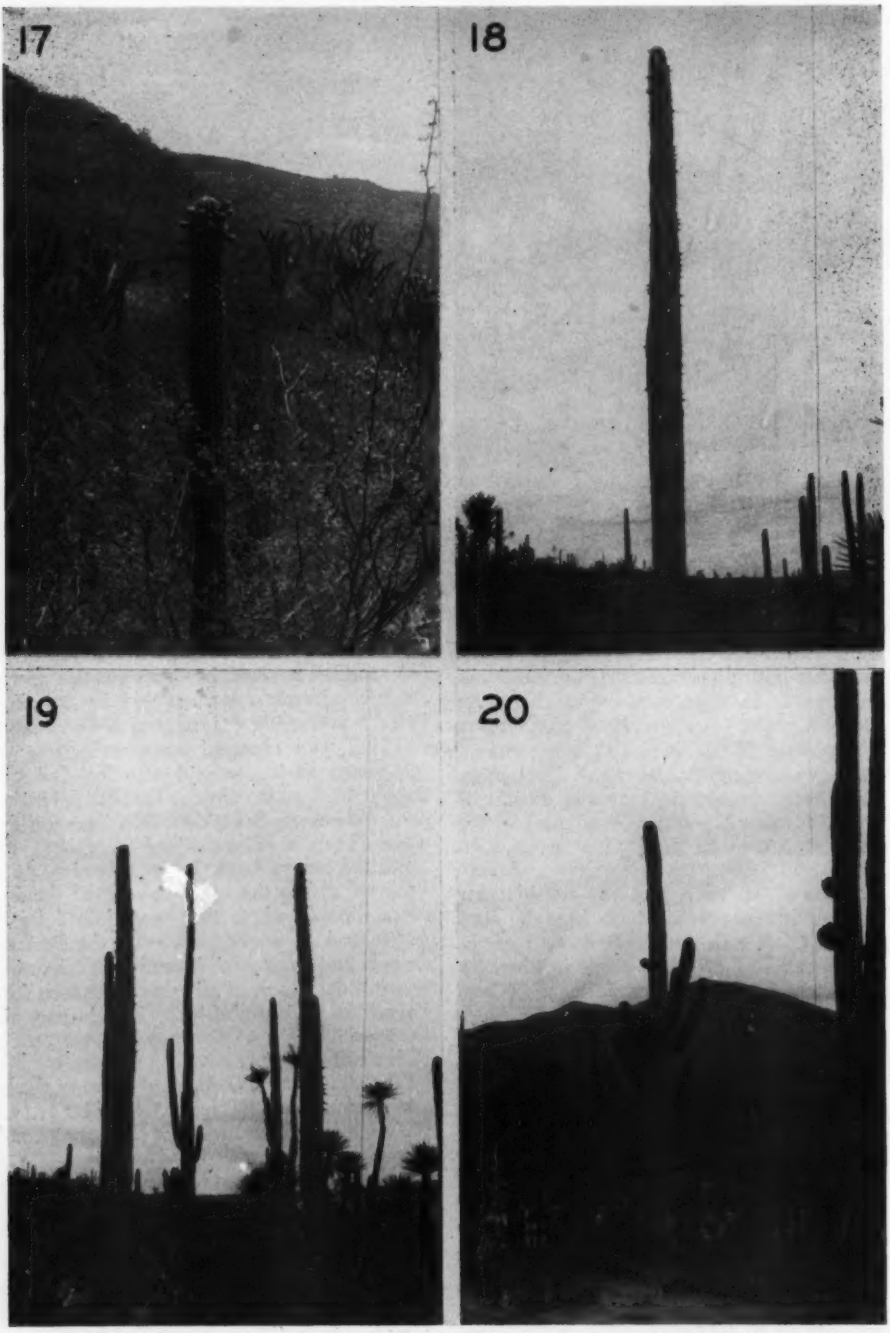
First described from rather low elevations on the Pacific watershed in Guerrero, this species (as var. *robustus*) was reported by the writer (1948) in the Rio Atoyac area of Oaxaca, and now has been observed northward across the continental divide to within a few miles of Zapotitlán, Puebla. On the road from Huajuapan, Oaxaca to Zapotitlán colonies were first observed several miles south of Chazumba. They continued on to beyond San Sebastian de la Frontera and to the upper reaches of the Barranca Grande where they were joined by *N. tetetzo* and *N. macrocephala*. In the Barranca Grande *N. mezcalaensis* is confined to elevations above 5000 ft. several miles up the canyon from Zapotitlán. This probably explains in part why the species was not encountered in the area by earlier cactologists.

The transfers, *Neobuxbaumia mezcalaensis* var. *multiareolata* (Dawson) comb. nov. and *N. mezcalaensis* var. *robusta* (Dawson) comb. nov., are called for.

NEOBUXBAUMIA SCOPARIA (Poselg.) Backbg.

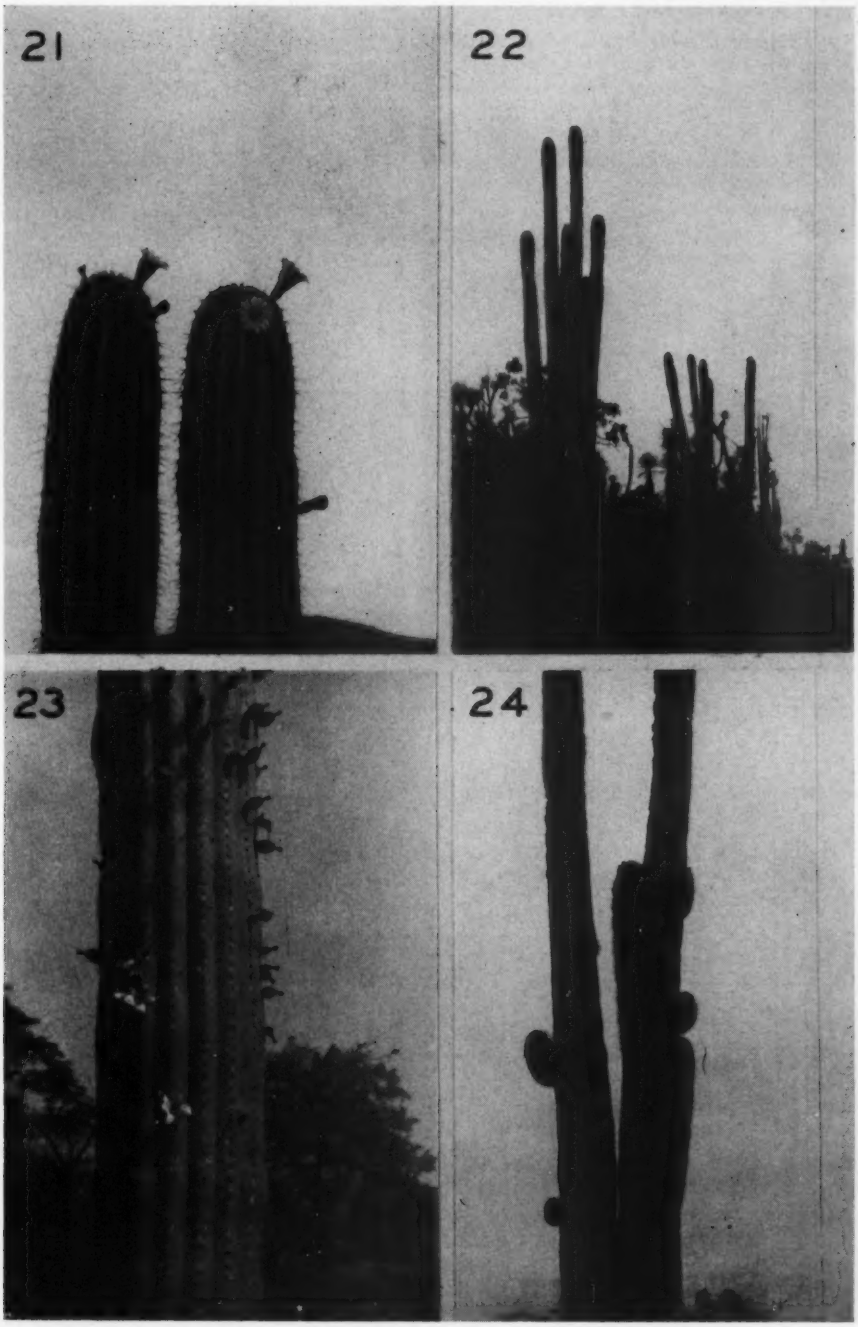
Pilocereus scoparius Poselger, 1853, p. 126.

This plant was known to Britton and Rose only through the original description and was placed in their *Cephalocereus* "catch-all" apparently for want of any better alternative. The writer has recently observed this species in the



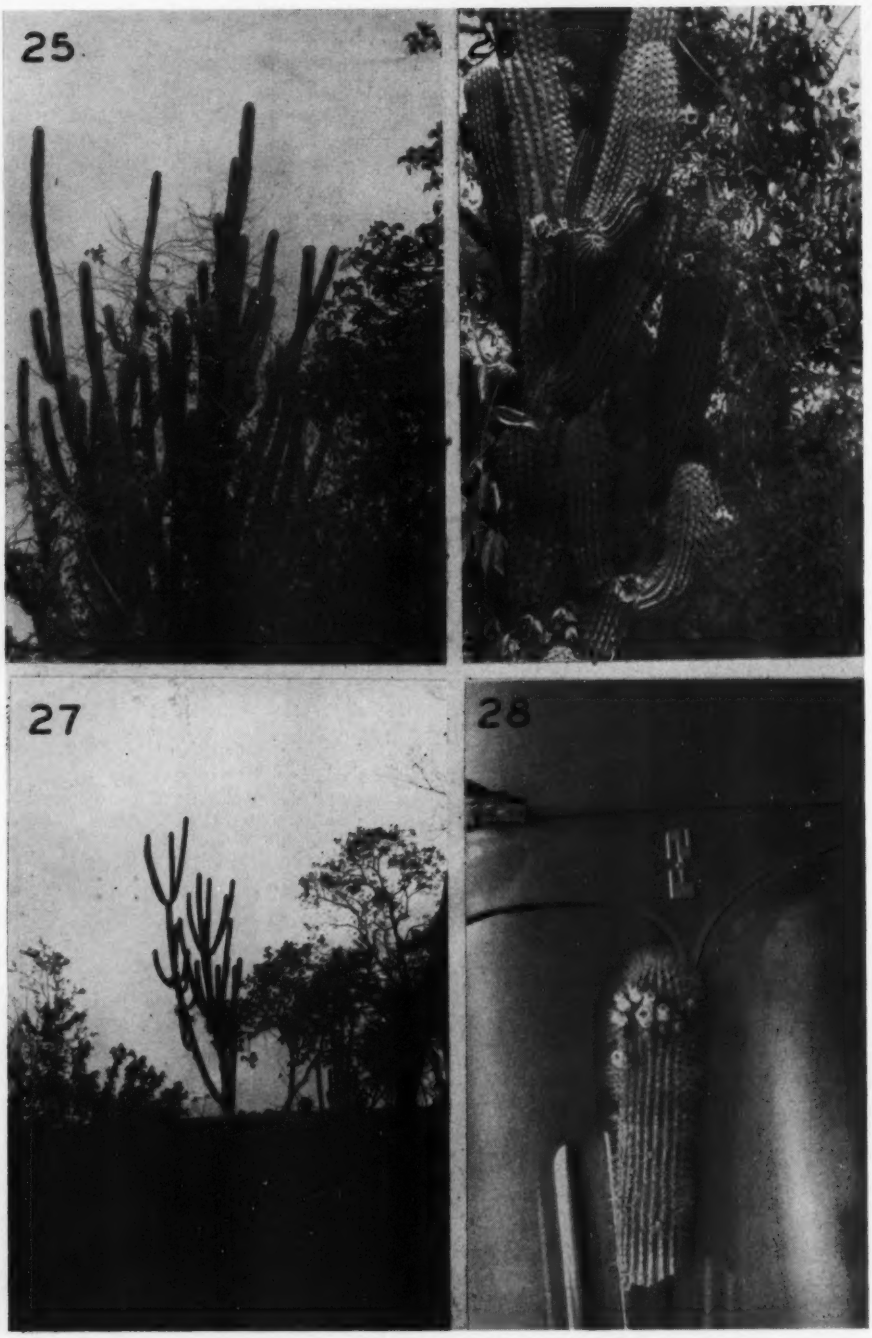
(Jour. Fig. 115)

FIG. 17. Fruiting *N. tetetzo* var. *tetetzo* near Totolapan, Oaxaca. FIG. 18. Fruiting *N. mezcalaensis* var. *robusta* near San Sebastian de la Frontera, Puebla. Note the white, open fruits. FIG. 19. *N. mezcalaensis* and *N. tetetzo* (middle) fruiting between San Sebastian de la Frontera and Zapotitlán, Puebla. FIG. 20. *N. macrocephala* 8 miles west of Zapotitlán, Puebla.



(Jour. Fig. 116)

FIG. 21. *N. mezcalaensis* in flower, early morning, near San Sebastian de la Frontera, Puebla. FIG. 22. *N. macrocephala* 8 miles west of Zapotitlán, Puebla. FIG. 23. Fruiting *N. mezcalaensis* var. *robusta* near Acatlán, Puebla. FIG. 24. *N. macrocephala* 8 miles west of Zapotitlán, Puebla.



(Jour. Fig. 117)

FIG. 25. Habit of *N. scoparia* along the Jalapa road 25 miles north of Vera Cruz. FIG. 26. Young lower branches of *N. scoparia*, same locality. FIG. 27. Habit of *N. scoparia* along the Jalapa road about 35 miles north of Vera Cruz. FIG. 28. Flowering branch-tip of *N. scoparia*, near Puente Nacional, Vera Cruz.

state of Vera Cruz along the watersheds of the Rio Antiguo and Rio Paso de la Milpa. On the Jalapa road it was observed between Puente Nacional and Cerro Gordo. It grows on rocky places amid heavy stands of small trees in an area subject to heavy rainfall. When its peculiar flowers and fruits were compared with those of the plant described by the writer as *Lemaireocereus setispinus* from near Juchitán, Oaxaca, (Dawson, 1948, p. 19, fig. 28) it was seen immediately that the two were identical. The latter name must be reduced, but in so doing the range of *N. scoparia* is extended from the Vera Cruz area east of Jalapa across the Isthmus of Tehuantepec to within a few miles of the Pacific.

The flowers and fruits (figs. 10-13, 28) are produced near the tips of the taller branches. The fruits are greenish to slightly pinkish at maturity, with a white, non-juicy pulp. The fruit splits from the top in a manner similar to *N. tetetzo* and *N. mezcalaensis,* and the segments, which are white within, spread to permit the pulp to drop out or be taken by birds.

NEOBUXBAUMIA MACROCEPHALA (Weber) comb. nov.

Cephalocereus macrocephalus Weber, in Schumann, 1897, p. 197.

This gigantic plant was encountered on the Huajuapan, Oaxaca-Zapotitlán, Puebla road at elevations above 5000 feet about 9 miles west of Zapotitlán. It was observed thence for about six miles eastward growing amid *N. mezcalaensis* and then *N. tetetzo.* It was readily distinguished by its branching, its greater diameter than either of the others, and by its usually pinkish colored spines of the growing apices. The mature upper parts produce longer, more bristly spines than the lower, vegetative parts and the flowers are borne near the apex. The flowers are red (at least the outer perianth segments) and are spineless, with broad, fleshy, overlapping scales on tube and ovary. The fruit develops some curly bristles toward maturity but retains the fleshy, imbricated scales without much change of form or color except a browning and drying of their margins. Open flowers were not seen, nor were ripe fruits, but nearly mature fruits in which the seeds had already turned brown showed a white, firm, juiceless pulp as in the other species treated here. Some old fruits were found which had lost their seeds and were somewhat dry but showed a splitting of the pericarp into four or five segments similar to *N. mezcalaensis,* although the degree of reflexing of the segments at time of pulp discharge could not be determined.

Britton and Rose retained this species in their *Cephalocereus* but recorded no knowledge of the fruit. The flowers were incorrectly described as having a *few distant* scales on the tube. Flowers or fruits have apparently never been illustrated.

The habit of this great plant, its ribbing, essentially unmodified flowering zone, and the scaly, greenish fruits with juiceless, white pulp seem clearly to ally it closely with the other four *Neobuxbaumia* species. It should be noted, however, that in gross morphology this plant shows the greatest similarity to *Carnegiea gigantea* of any of the five.

NEOBUXBAUMIA POLYLOPHA (DC) Backb.

Cereus polylophus DeCandolle, 1828, p. 115.

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ILLUSTRATED LECTURE

Dr. E. Yale Dawson will show Kodachromes of his Mexican field trips at the Allan Hancock Foundation Auditorium, University of Southern California, Dec. 9, at 8 p.m. Among his interesting slides will be a fine showing of cacti and the other succulents of Mexico. Mark the date so you will not miss a rare treat.

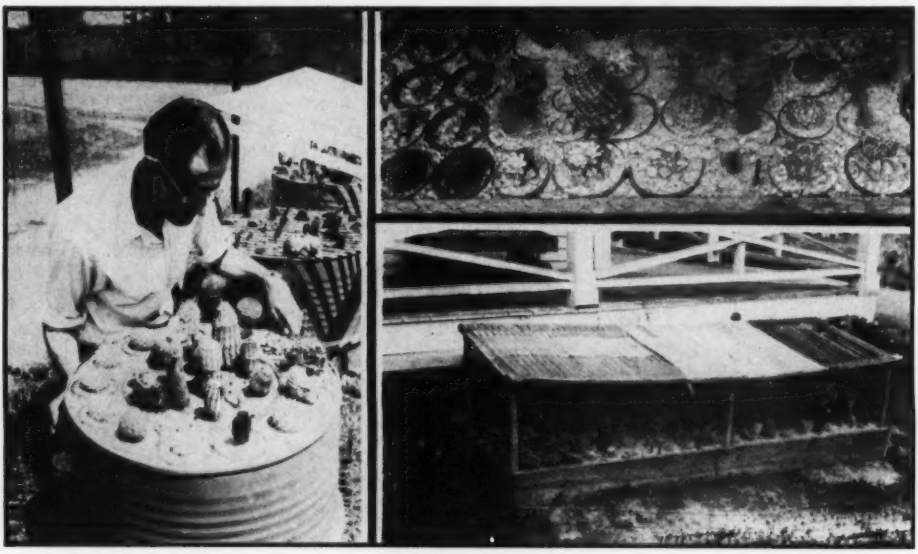

FIG. 118. R. E. Blair and his planting methods.

OIL DRUM CACTI

By RUFUS E. BLAIR

Ideas, we have lots of them, but most are of little value to anyone. However, we do come up with an idea once in a while that seems to work out rather well, at least the one I'm going to tell you about, did for me.

I started collecting caclti in the fall of 1940 with eighteen unlabeled blooming size plants of the collected type, which I purchased from a Texas dealer. Upon arrival the plants were soon potted in two-thirds garden loam, one-third sand and a little old plaster, like the meager directions which came with them called for.

Realizing I knew almost nothing about these strange plants and failing to find cultural information wanted at the public library, I contacted several publishing companies. From one of these companies "The Cactus Book" by Houghton (now out of print) was purchased and I believe it to be one of the two best cactus books ever written for the beginner. The other book is "Cacti for the Amateur" by Haselton.

After some study I gathered that for best results, potted plants should be plunged in a well drained rockery, or garden spot, after all danger of frost is past in the spring. This meant a built up affair of some kind would have to be made, as the land was flat and full of clay. We were planning on moving up town in the fall, so what I needed was something that could be moved without too much trouble, that would last a long time and look good. A number of things could be used, but all had their bad points. Then one day as I tossed a tin can into the rubbish barrel the idea came to me. Why not use one of the two old 30-gallon steel oil drums we were using for rubbish? Seeing the top of drum had already been removed, all I needed to do was cut out the bottom. This done, it was cleaned, painted, stood on end, filled with sand and my potted cacti plunged in same. Drum was too tall to look well, but did serve the purpose and three of the plants bloomed that summer.

The following winter, two 55-gallon steel oil drums were purchased from a filling station, the kind having both plug openings on their end. Ends of oil drums were cut out with a cold chisel and all rough edges pounded down. A hacksaw was used to cut drums in half and a file to remove all remaining rough edges. After cleaning half drums good with a wire brush and gasoline, so as to remove all dirt and oil, I painted them. The inside being given two coats of Asbestos Fiber Roof Paint, outside two coats of Tractor and Implement Paint. I find that drums do not rust if painted this way, but moisture from sand will soon rust a hole through

same, unless painted on inside with some kind of asphalt paint.

A lath frame was built to go over two of the four half drums which had been placed in a row and filled with sand. This frame rested on four pieces of old water pipe driven into the ground. Angle irons fastened to one side of the frame and by a single bolt to the tops of two pipes served as hinges. Frame furnished shade for plants that could not stand full sunlight, yet was not in the way, seeing it could be raised or lowered, making it easy to get at the plants.

Come summer I plunged my potted cacti in the four half drums, which were just low enough to look good, but at the same time high enough so the ants did not seem to give any trouble. Twelve different plants rewarded me with blossoms that year.

Here in Middleboro, Massachusetts, the danger of frost is not past until June 1st and come September you can expect one anytime. That did not give the plants much time out-of-doors, so I made up my mind to do something about it. True the weather could not be changed, but with some old boards and a little chicken wire a sort of pen was built. It was built so the lath frame which I had over two of the half oil drums for shade, could be changed from drums to pen, or pen to drums. The pen being small and low down could be covered nights with a couple old blankets sewed together, a rope being tied around the bottom of same to hold it in place. This would protect plants from frost, which made it possible for me to get my plants out in the pen by the middle of April, or the first of May. When danger from frost was past, the plants were moved into oil drums, where they stayed until September. Then back to the pen the plants went, where they could be covered with a blanket nights. By doing this I was able to leave my plants out last year until November 10th.

Yes, it was a lot of work moving and covering the plants so much, but I think it worth my trouble. The reward being better looking plants, due to more normal growth. I had 26 different plants bloom, four being in bloom at once and up to eight blossoms open on one plant at a time.

The pictures show me with my plants and just how this half oil drum, pen arrangement of mine looks, also a few of the cacti in bloom. The reason for wire on pen was to keep blanket from getting caught in cactus spines. Wire also kept out stray cats and dogs, but not the ants which gave me plenty of trouble, due no doubt to the fact that plants were so near ground level.

Any suggestions you care to offer will be welcome and I shall be glad to answer any questions you wish to ask about my drum, or pen arrangement, etc. Send them to R. E. Blair, 191 So. Main Street, Middleboro, Mass.

* * *

VEGETATION OF THE SONORAN DESERT—1951

Carnegie Institution of Washington, 1530 P Street, Northwest Washington 5, D.C., xii plus 192 pp., 27 maps, 37 pls. by Forrest Shreve. $3.25 paper bound; $3.75 colth bound.

The Sonoran Desert as here outlined includes the arid parts of Arizona, Sonora, Baja California, and southeastern California lying below 3500 feet elevation. The first two chapters define the problems and discuss such physical factors as terrain, soil, drainage systems, and climatic conditions.

Chapter three deals with the perennial vegetation and the author's delimitation of the seven vegetational subdivisions recognized. The vegetation of the area is compared with that of the other three main deserts of North America, and the scheme is documented by lists of the important plants found in different habitats in each subdivision. A penetrating discussion of the life forms of the Sonoran Desert and their role in the physiognomy of the vegetation is also accompanied by supporting lists of plants.

Discussion of the ephemeral herbaceous vegetation and its geographical distribution outside, as well as within the Sonoran Desert, constitutes chapter four.

The fifth chapter presents in detail the ecology of 26 of the most characteristic plants of the area; distribution maps are given for 13 of these species and for 11 other species. Thirty-seven half-tone plates picture the chief characteristics of the Sonoran Desert and of its vegetation.

There are many interesting observations of the cacti in particular. For instance, "The native American succulents are immune to long seasons of drought, but require favorable periods for replenishment of the water content of their tissues. In the region of bi-seasonal rainfall, replenishment is greater in the summer than in the winter, being slight during periods of low soil temperature. All cactus seeds require a soil temperature of 70-80° F. for germination, and most of them germinate more surely and quickly in the range 80-90° F. Mature cacti are subject to damage from frost if the temperature falls below 14-23° F. for a longer period. Under any given temperature range, turgid plants are much more susceptible to injury than plants with low water content. In spite of immunity to normal drought periods, cacti are abundant only in the regions in which the soil is periodically warm and moist at the same time, favoring both root absorption and seed germination, and in regions in which winter minima are neither very low nor very prolonged. Small or procumbent species of cacti endure very cold winters in regions where the frost season is preceded by a dry period, during which the water content of the plants is reduced."

A scholarly treatment of a lifetime's study of the desert by one of our charter members of the Cactus and Succulent Society of America.

* * *

The September issue of the *Green Thumb*, published by The Colorado Forestry and Horticulture Association, Denver, Colorado, contained an interesting popular article "When Is a Cactus Not a Cactus" by Elizabeth Eckstein. There was also an illustrated write-up about the author's garden.

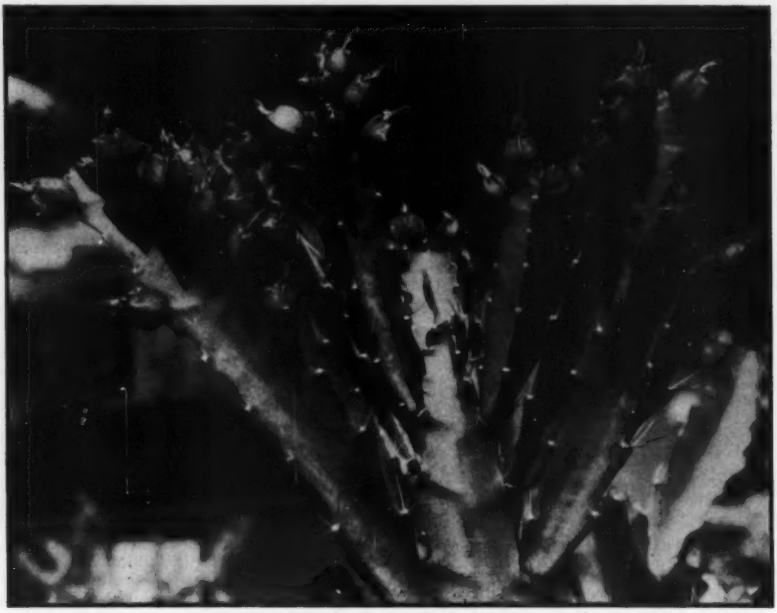

FIG. 119. *Rhipsalis monacantha* Grisebach showing immature fruits on *West 7022* (UCBG 36.1843). Photo by author.

STUDIES OF SOUTH AMERICAN CACTACEAE

1. The Identity and Status of Rhipsalis monacantha Grisebach*

By P. C. HUTCHISON

Rhipsalis monacantha Grisebach has been a source of confusion for taxonomists since its appearance in the literature in 1879. Grisebach (4) refers to the flower as black when dried. Schumann (6) states that it is white. Britton and Rose (2) state that both flower and fruit are white and they include this species in their genus *Acanthorhipsalis,* one of the characters of which is "perianth-segments united into a short tube." As is indicated below neither white flowers nor fruit are known for this species and I have not been able to demonstrate the existence of a tube in the flowers.

Three collections of *R. monacantha* were made during the First and Second University of California Botanical Garden Expeditions to the Andes (1935-36, 1938-39), and are represented in the University Herbarium. Two of these collections are further represented by additional material in cultivation at the University of California Botanical Garden (Berkeley). This species blooms freely and sets abundant seed. The perianth segments are brilliant orange and distinct to the base; the strongly angled and ribbed ovary develops over several months into a bright orange, angular fruit with 4 or 5 prominent vertical ridges. Later the fruit color changes from orange-red to orange-pink, fading to pale pink at maturity; the fruit swells to an almost globose form and the prominent ridges become obscure. Finally the fruit tissue becomes almost translucent pink and the seeds can be seen through the epidermal layers as a darkened mass.

U.C.B.G. No. 36.1843 was grown from seed collected by James West (*West 7022*) in March, 1936, during the First University of California Botanical Garden Expedition to the Andes. It was originally found by Sr. Klein near Jujuy, Argentina, at an altitude of 2000 meters, epiphytic on trees in woods near a river (probably Río Grande) and was cultivated in Sr. Klein's garden in Jujuy. This plant was observed in

*University of California Botanical Garden, Berkeley, Contribution No. 124.

flower and fruit in 1950 at the botanical garden and in attempting to identify it I found its only apparent differences from *Rhipsalis monacantha* (as described) to be in flower and fruit color and its lack of a perianth tube. I wrote to Dr. Alberto Castellanos of Buenos Aires, a noted authority on Argentine cacti, inquiring whether he had seen material of *R. monacantha* and describing this plant to him. Dr. Castellanos generously replied in great detail, noting that he had seen material of the type of *R. monacantha* at the herbarium of the University of Göttingen, that the flowers were not white, and that he had found no evidence of a tube on this or other material of this species that he had examined. He kindly forwarded an original watercolor sketch from living material of *Beetle & Eyerdam 22668* (cf. below). At his request cuttings from this collection, which was in cultivation at the Instituto Miguel Lillo of the Universidad Nacional de Tucumàn, were sent to me by Sr. F. B. Vervoorst. Since then plants of this number, cultivated as U.C.B.G. 51.1388, have also flowered and set fruit. Figure 120 has been adapted from the aforementioned sketch and flowering and fruiting material of these two living collections, and the details check closely with all herbarium collections of this material that I have examined. The following emended and expanded description is likewise based on study of this living material and of the cited dried material.

Rhipsalis monacantha Grisebach. Abh. Ges. Wiss. Göttingen **24**: 140, 1879.

Hariota monacantha (Gris.) Kuntze, Rev. Gen. Pl. 50: 263, 1891.

Acanthorhipsalis monacantha (Gris.) Britton & Rose, Cactaceae 4: 212, 1923.

Stems first upright, then pendent, much branched laterally and (rarely) terminally, 2.0 to 3.0 cm. wide, 4.5 dm. long, flattened or 3-angled, serrate, somewhat cuneate at the base of each branch. Areoles 1 mm. in diam. on young growth, 2 mm. on older stems, 10 to 12 (4 to 18) mm. apart, white-felted, with 0 to 6 upright to horizontally spreading yellowish or whitish spines to 1.0 cm. long subtending the flowers, old areoles with few additional shorter fine bristles or none. Flowers lateral, solitary, *ca.* 15 mm. long at anthesis, corolla 12 mm. broad. Perianth segments 8 to 12, bright waxy orange, outermost 3 to 5 reduced, obtuse, clasping; inner segments 10 mm. long, 5 mm. broad, spreading, oblong, obtuse or barely acute at apex; margins slightly inflexed. Stamens numerous; filaments 3 to 6 mm. long, white or cream, the outermost slightly spreading, incurved apically; the central ones shorter, erect. Style 6 to 7 mm. long, white or cream. Stigma 5- or 6-lobed, white, exserted; lobes 3 to 4.5 mm. long, spreading unequally and slightly to strongly recurved. Ovary 6 mm. diam., slightly longer than broad, strongly 4- to 5-angled, green or reddish-tinged, bearing on its surface 2 to 5 small scales with tufts of felt in their axils. Fruit globose, 8 to 10 (6 to 12) mm. diam., scales withered, with 4 or 5 obscure ribs, at first orange, later orange-red, fading to pale pink; perianth withering-persistent. Seeds *ca.* 1.5 mm. long, subpyriform in outline, compressed, pitted, dark brown; hylum oblong, usually *ca.* 0.7 mm. long.

Type: from hills of San Andres near Oran, Prov. Jujuy, Argentina, *Lorentz & Hieronymus* (GOET)*

Range: northwestern Argentina in the Province of Jujuy and Salta; usually epiphytic on large trees in deep shade; 650 to 2000 meters altitude; flowering at least from October to January.

Argentina, Prov. Jujuy, Dept. Ledesma: Calilegua, *Shafer 56* (GH, NY), *Shafer 67* (NY); 17 km. N of Calilegua, Arolla La Cantara, Cerro de Calilegua, *Eyerdam & Beetle 22668* (UC); Sierra de Calilegua, *Venturi 5470* (F, GH); Hort. U.C.B.G. from seed from plant collected near Jujuy, *West 7022* (UC). Prov. Salta, Dept. Oran: cf. type; 50 km W of Manuela Pedraza, Cerro Ytau, *Eyerdam & Beetle 22749* (UC).

The peculiar ribbing of the ovary of *R. monacantha* and *R. Lorentziana* Gris., as well as of several other species of the genus, is particularly striking and does not appear to have been mentioned. Castellanos (3) illustrates fruit of the latter species in which the ribbing is well-marked, although the fruit itself is more ellipsoid than in *R. monacantha.* Both species were originally collected in the same locality, but *R. Lorentziana* differs in its spineless stems, green fruit and white flowers.

Kuntze (5) placed this species in *Hariota* De Candolle, 1834, a homonym of *Hariota* Adanson, 1763. Schumann (6) retained it in *Rhipsalis* and erected the subgenus *Acanthorhipsalis* for it, distinguishing it from the rest of the genus primarily by the presence of spines in each areole. Britton and Rose (2) raised Schumann's subgenus to generic rank; however, they redefined it, adding such critical characters as "perianth segments united into a short tube" and "ovary bearing on its surface small scales with tufts of felt in their axils, at least in typical species." Three species were included in

*In this and subsequent papers in this series the abbreviations of herbaria follow Lanjouw, J. & Stafleu, F.A., *Index Herbariorum* in *Regnum Vegetabile* 2(1), 1952.

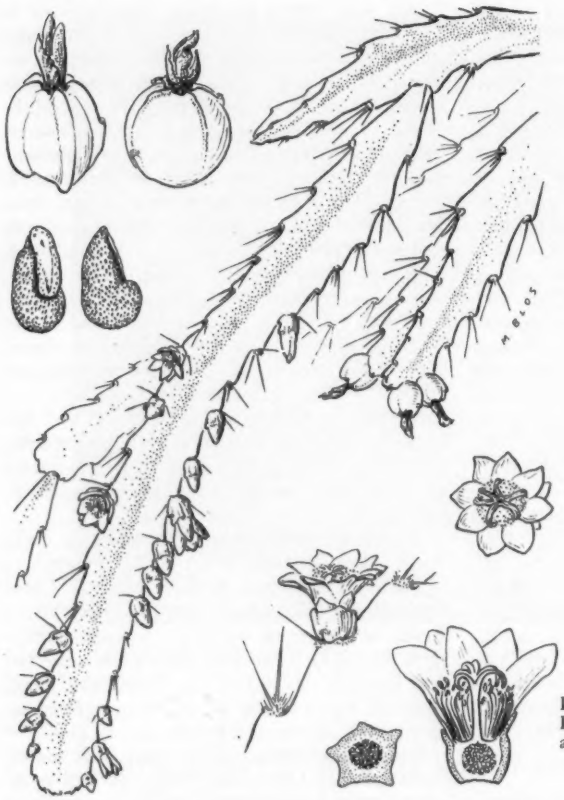

FIG. 120. *Rhipsalis monacantha* Grisebach. Habit, 0.4 x; flower, 1. x, sectioned flower and ovary, 1.5 x; immature and mature fruits, 1.5 x; seed, 10 x.

their concept, *Cereus micranthus* Vaupel, *Hariota crenata* Britton and *Rhipsalis monacantha* Grisebach, the first of these as the type of the genus *Acanthorhipsalis*. Vaupel's illustration (7) of the type (as *Rhipsalis asperula* Vaupel) shows spination of stem and tufts of felt subtended by small scales on the ovary; the presence of a tube seems to be indicated, but this character is not mentioned in his description.

Backeberg (1) credits Britton and Rose as stating in their generic description that *one* species showed a short tube. However, the mention of a tube by the latter authors, as has been shown above, is in the generic description and hence in theory, unless otherwise indicated, applicable to all three species. It is not otherwise indicated. Backeberg concludes that the presence of spines on the three species of *Acanthorhipsalis* is a decisive generic character, but there is more evidence against this criterion than for it. Spines or modified bristles are found in at least 16 species of *Rhipsalis*. If the members of the *Rhipsalidanae* are arranged in series on the basis of spination, a complete gradation from spineless to very spiny stems is readily seen and this gradation in a vegetative character apparently is not correlated with any significant floral characters. For example, one of the closest relatives of *R. monacantha* is *R. Lorentziana* with white flowers and spineless stems. *R. Lorentziana* also has a ribbed ovary and stems which are flat and serrate as in *R. monacantha*. The intergradation of spine types is so complete that in some species it is difficult to distinguish between spines and bristles; for example, in the description of *Rhipsalis aculeata* Weber, Britton & Rose cite "8-10 appressed white bristles or spines." Other species have areoles variously described as naked, hairy, setose, woolly or ciliate. If the more obvious, rigid type of spine constitutes by its presence or absence a generic character then we have ample reason for splitting many Cactaceous genera which seem on the basis of floral characters to be quite cohesive. For example, the Mexican species *Astrophytum capricorne* and *A. ornatum* are both spinescent whereas *A. myriostigma* (generic type) and *A. asterias* are both spineless or nearly so. The

Chilean species *Neochilenia occulta* (Ph.) Bckbg. may be spiny or spineless depending on the season in which it is collected! In some genera spineless sports are quite common, an excellent example being the Mexican *Mammillaria bocasana,* in which a number of horticultural forms are known.

If the very spinescent types of *Rhipsalis* are to constitute a segregate genus, then by the same reasoning the remaining species can be segregated on the basis of spination into as many genera as there are kinds of spination.

Backeberg[1] compares *Acanthorhipsalis* with the monotypic Argentine genus *Pfeiffera* Salm Dyck, citing as indications of a close relationship spiny stems, epiphytic growth and white fruit.* In the *Rhipsalidanae* strongly spiny stems are uncommon, but epiphytic habit is the rule. The fruits of *Pfeiffera ianthothele* (Monville) Weber are quite different from those of *R. monacantha* at least, not only in color but in the following characters as well:

P. IANTHOTHELE	R. MONACANTHA
12-16 mm. diam.	8-10 mm. diam.
smooth	ribbed
spiny	spineless
rose-red	orange to pale pink

Backeberg goes on to state** that if we disregard the great differences of these spiny relatives of *Rhipsalis,* we would not be solving the evolutionary developments and the clarification of his systematic survey! Granting that his systematic survey needs clarification, I cannot see how this will be accomplished by creating new genera or by recognizing those that are scarcely distinct. By extrapolation we would soon have a genus for each species, and *ipso facto,* phylogeny would be perfectly clear! It is not clear, however, why a phylogenetic system for the Cactaceae cannot be presented tentatively and in a well documented form, without transferring most of the recognized species to new segregate genera, as he has done.

More recently Backeberg has suggested (*in litt.*) that *Acanthorhipsalis* might be distinguished from *Rhipsalis* on the basis of ovary differences. He suggests that *Rhipsalis* could be typified as "ovary devoid of scales or with ± small scales, no felt, wool, bristles or spines, flowers tubeless," as opposed to the tubed flowers in *Acanthorhipsalis* and an ovary with small scales with tufts of wool in their axils. Even this arrangement breaks down, for if the tubeless flower is to be retained as a generic character, then *R. monacantha* must be placed in *Rhipsalis* and the character of the ovary in this instance cannot be retained as a generic difference. On the other hand, if the ovary character is to be retained, then the tubed vs. tubeless flower cannot, for the same reason. Further, on the basis of the ovary alone, several other species of *Rhipsalis* with spineless stems and tubeless flowers fit conveniently into *Acanthorhipsalis.*

Rhipsalis monacantha Griseb. seems to be intermediate between *Acanthorhipsalis* and *Rhipsalis* series *Lorentzianae* of Britton and Rose. *Acanthorhipsalis* may be considered of most dubious status as a genus. The three characters on which it is based vary independently. Two of them are not distinctive and the third (perianth tube) seems scarcely sufficient in itself to characterize a genus. With the removal of *R. monacantha* from this assemblage of three species supposed to have these three characters, the status of *Acanthorhipsalis* becomes more questionable. The only characters by which it can be said to be distinct from *Rhipsalis,* if *R. monacantha* is to be excluded, is "perianth segments united into a short tube," and there is not material at hand to learn what Britton and Rose meant by a "short tube." In *R. monacantha,* at least, the "tube" is too short to be seen! Living material of *Acanthorhipsalis micrantha* (Vaup.) Br. & R., the generic type from Peru, or of *A. crenata* (Br.) Br. & R., from Bolivia, is not available at the present time. Herbarium specimens which I have examined are too fragmentary to admit as conclusive evidence.

In summary, the combination of foliar and floral characters found in *R. monacantha* seems to indicate a closer relationship with *Rhipsalis* than to any other genus in the *Rhipsalidanae,* and its differences from other members of *Rhipsalis* are not definitive. It is entirely possible that when *A. micrantha* and *A. crenata* are cultivated and careful comparative studies made they too will prove scarcely distinct enough to be maintained in a separate genus.

*Neither *Pfeiffera* nor *Rhipsalis monacantha* have white fruit.

**"Dadurch, das wir bei dieser stacheligen Rhipsalisverwandten einfach ihr grösstes Unterscheidungsmerkmal ausser acht lassen und sie wieder zu Rhipsalis stellen, dienen wir jedenfalls nicht dem Suchen nach den Entwicklungswegen und der grössten Klarheit unserer systematischen Ubersicht."

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THE BEAUTIFUL ARIZONA RAINBOW CACTI

By WM. MASTRANGEL, *Rocking Horse Cactus Gardens*

The beautiful Arizona Rainbow Cactus, with the scientific name of *Echinocereus pectinatus* var. *rigidissimus* (Engelmann) Engelmann ex Rumpler, listed in Britton and Rose as *Echinocereus rigidissimus,* is one of the most beautiful of all Arizona cacti; in fact, it is considered by many as one of the prettiest of all North American succulents. The Arizona Rainbow is not to be confused with the Texas Rainbow—which is *E. dasyacanthus,* a plant with longer and denser spines and much paler in color than the Arizona Rainbow.

Our favorite plant is easily distinguished from other Echinocerei by its stout stems with many pectinate spines strongly appressed, with no central spines. The spines vary from buff or straw color to a rich crimson rose; there are generally stripes of these rose colored spines running ring fashion around the stem—sometimes narrow, or occasionally broad. At times Rainbows are almost entirely without the reddish spines, while other specimens have many such reddish bands. I have seen specimens in the field which had all their spines in the reddish hue. It is very striking to walk up a hillside full of Rainbow cacti and see at a glance, dozens and dozens of reddish balls sprinkled in the grass. It reminds me of Christmas—a carpet of green grass with the merry red spheres dropped here and there.

The Arizona Rainbow occurs on gravelly hillsides and grassy slopes in southern Arizona and northern Sonora, Mexico. It is closely associated with open oak woodlands at 4,000 to 6,000 feet elevations. The plants generally run from two to four and one-half inches in diameter, and from three to fifteen inches in height. It is definitely an exotic plant, since there are not many available. Very few are raised from seed and the plant is seldom listed in dealers' catalogues—Personally I do not believe that anyone has a full collection until they have acquired a nice specimen of both the Arizona Rainbow cactus, and the Mexican Old Man (*Cephalocereus senilis*)—the red and the white.

Culture—After long experimentations with our favorite plant, and trying various soils—I have found that it thrives best in a well drained soil composed of one-third oak leaf mold (strained through one-quarter inch screen), one-third gravel or coarse sand (strained through one-quarter inch screen), and one-third good top soil, silt or loam. To this mixture, add about 10% old lime (mortar rubble, granulated) and 10% granulated charcoal. Plant in a large 7" pot. lining the bottom with 1½" of coarse gravel, add a thin layer of granulated charcoal, then add the above soil mixture. When plant is received, cut off most of the roots with sharp scissors, being sure to clip off all the dry roots close to the stem and all broken roots, above the break. Dip the cut roots into powdered sulphur and lay the plant on its side in the shade for about a week. It then may be planted in the pot. The Rainbow cactus does much better planted in a pot than it does in a cactus bed or box. Mark one side of the pot with an S, denoting south, and keep that side always to the south. Give the plant plenty of sun and fresh air, and during the growing season. During the winter months, water only once every six weeks. Repot every third or fourth year.

Flowers—The flowers of this gorgeous plant are just out of this world. They are funnelform, color of petals running from lavender to reddish purple and magenta in very brilliant shades. Looking into the flower, the base of the cup is a creamy white showing off the brilliant purplish petals. When fully opened, the flower is from three to five inches across from petals tip to

FIG. 121. The Arizona Rainbow Cactus.

petal tip. Although some plants produce only one or two flowers at a time, there have been many specimens observed that have produced as many as ten to fifteen of these large flowers in a single day. When the flowers open up in such a manner, it is just a mass of color, looking like a bouquet which almost obliterates the plant itself. The flowering period is generally in April and May, after a good winter's rest and a commencement of regular watering sometime in March.

Truly this red beauty is a plant that is worthwhile and once it has been seen in flower, it can never be forgotten.

Next issue—The Golden Ball Cactus.

STEALING CACTUS

The Cactomaniac has many ways open to him by which he can add plants to his collection. The simplest procedure is, of course, to purchase these from reputable dealers or growers. In the long run this is the cheapest as well as the safest way. Slower and much more complicated is the raising of cactus from seed. This method requires lots of careful attention and for the amateur the results are usually not worth the trouble. Then there is the collecting of plants in the wide open spaces, a very satisfying task in itself. But when busted crankcases, tires and tempers are added up we find that such plants come exceedingly high. Popular is the method of begging and cadging plants from other people by sighing, groaning and drooling over their collections until the bored owner gives you what you want, if only to get rid of you. Finally there is the most noble and soul satisfying method of them all, the stealing of cactus.

In times gone by, when a cactus was still not easy to come by, the stealing of these plants was almost universally practiced by the fanciers. A sad individual indeed was the man who never missed a cactus, as such an oversight by other cactomaniacs was tantamount to a testimonial to the worthlessness of his collection.

Now the stealing of cacti is still being done but the present crop of operators lack the finesse of the old-timers. I feel that this is the time to re-affirm the code of ethics which once was, and should again be, observed by those who are still practicing this vanishing art. Cactus collecting is a hobby, but the stealing of cactus is a hobby within a hobby and well deserves again to be raised to the level of an art. Indeed there is no greater satisfaction than the possession of a beautiful plant, properly stolen, especially so when you realize how boiling mad its previous owner must be over his loss.

An unguarded collection or garden must be left alone. This is stealing candy from a child and must remain beneath the craftsman's dignity. Equally deplorable is the stealing from a kind and courteous host who offers you the run of his place and any of his spares or cuttings you might like to have. To steal plants here would be like hunting rabbits with medium tanks, or shooting quail with bazookas. No sportsman would even consider it. But when we call upon an individual who treats you with suspicion, as if he knew of your motives already, who is crabby and ungracious, who is reluctant to have you see his plants and watches you at all times, we may consider ourselves on legitimate hunting ground. The task of relieving such an individual of his most cherished plant should be joyfully undertaken and pursued to its successful conclusion like a holy crusade.

Four qualifications are needed to the stealing of cacti. First we require a bit of manual dexterity, easily acquired with a little practice. Second we need a working knowledge of applied psychology for properly buttering up and softsoaping our prospective victim and to divert his attentions from our hand. Thirdly we need a fair amount of stamina and intestinal fortitude in order to endure the more painful part of the stealing process. Last but not least we require a large amount of moral courage or, as some unsympathetic person might describe it, plain unmitigated gall.

After gaining admission to our prospect's collection we go into our spiel. A rapid conversation is carried on, liberally sprinkled with poorly pronounced Latin names. This is done in a rather low voice so that your intended victim has to keep his eyes on your lips in order to understand your words. Keep waving your hand and poke a finger at him as this will also focus his attention away from your real purpose. We now back up to the plant we have selected. While one hand keeps waving and poking we make the V for victory sign with two fingers of the other hand and move it behind our back. We gently feel for the cactus and use the fingers as a fork, the root of the plant is in the crotch of the fingers. A careful lift and a quick shake to remove the excess dirt, and casually the little cactus goes into your trouser pocket. That's all there is to it.

The animated conversation goes right on, of course, but here is where you need your intestinal fortitude. The cactus now has its inning and starts biting furiously. In no time are pocket-lining, shirt-tail and your skin combined into one solid aching lump. But there can be no flinching on your part; no limping or cold perspiration on your brow must betray your agony as you move on with your host to the next plant, that is if you think you can stand one more. Wait at least a half hour before taking your departure. A special feather in your cap will be if you can bum a drink from your host. This is a highly desirable feature as the memory of such hospitality will be like salt in the wound when later on he discovers the loss of a prize plant.

Here I feel called upon to point out some unethical practices which have lately made their appearance. Thus there is the case of one man, who, to protect himself, wrapped a Woman's Home Companion around his leg, fastening same with band-aids and Scotch tape. Such a practice is on a par with dynamiting trout and the true cactus thief should spurn such practices as unworthy of his craft. Equally deplorable is the use of leather pockets and linoleum underwear but such devices have been used, but I know that no high-class operator will stoop to such unsportsman's-like depths.

The removal of a stolen cactus should not be attempted until we reach home. Then great care must be exercised so that neither spines nor plant is injured. Pants legs may be cut off and shirt-tails can be amputated but at all times we must keep in mind that the plant is more important than mere clothes and physical discomfort.

There is no question that a plant acquired through theft and with all the rules and finer points observed is a prize well worth owning. Such a cactus deserves a place of honor in a cactomaniac's collection where it will be a source of joy and satisfaction forever, or at least until such time as some lowdown scoundrel will steal it from you again. When this second thief turns out to be your plant's previous owner, the cup of bitterness may be overflowing, but the cactomaniac takes such reversals in his stride always with the thought in mind that tomorrow it's his turn again.

C. E. MIEG, Scottsdale, Ariz.

NEW BOLIVIAN CACTI, III

By PROF. MARTIN CARDENAS

Part II

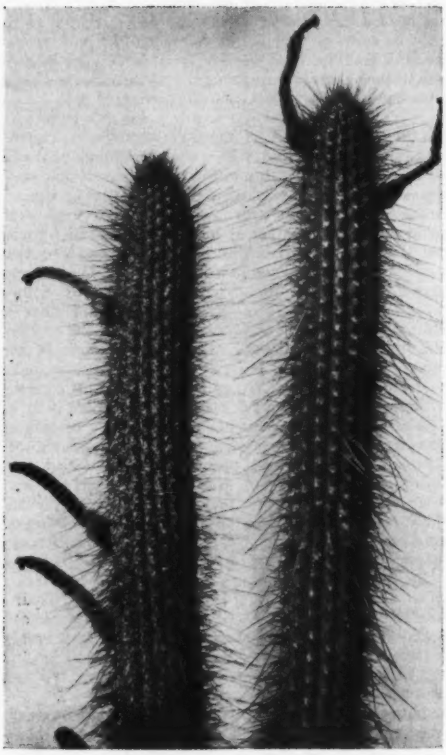


FIG. 122
Cleistocactus Buchtienii Bckb. var. *flavispinus* Cárdenas, var. nov. x 0.25

Cleistocactus Buchtienii Bckbg. var. flavispinus var. nov.

Erectus, ramosus usque 3 m. altus. Ramis virido flavis 4-4.5 cm. diam. Costis 16-19, transverso sulcatis. Areolis ellipsoidis, 8 mm. spatio separatis, 5 mm. diam., cinereo tomentosis. Aculeis radialibus 12-14, 5-20 mm. long.; centrali 1, 3-4 cm. long. deorsum directi; omnes aculeis acicularis, pungentis, paleari flavis. Flores pauci, ex superne ramis, 7-8 cm. long., fere fauce constrictis. Ovario tuboque roseo purpureo, squamis viridibus, acutis, densissime pilis, temperato brunei praedito. Phylla perigoni exteriora acuminata, atro viridia; interiora anguste spathulata, magentibus, 13 mm. long. Stamina duplici serialis; filamentis roseo albidis, antherae atro purpurae. Stylo 7 cm. long., albo, 8 ramis stigmaticis, viridibus coronato. Fructo 2 cm. diam., globoso fragari rubes, squamoso, denso albo piloso. Semina oblonga, 1 mm. long.

Erect, branched, up to 3 m. tall. Branches yellowish green, about 4.5 cm. in diameter. Ribs low, 16 to 19, with transverse furrows. Areoles ellipsoid, about 5 mm. in diameter, 8 mm. apart, gray felted. Radial spines 12 to 14, 5 to 20 mm. long, with one central spine, 3 to 4 cm. long directed downwards; all spines acicular, pungent and straw-yellow colored. Flowers rather few, from near the top of branches, 7 to 8 cm. long, slightly bent and constricted above the ovary and fauces. Ovary and tube purplish pink, covered by acute greenish scales which bear numerous dense, light brown hairs. Outer perianth-segments acuminate, deep green; inner segments magenta, narrowly spathulate, 13 mm. long. Stamens in two rows, lower ones 3 to 4 cm. long with pinkish white filaments, upper stamens 15 mm. long. Style about 7 cm. long, white. Stigma rays 8, light green, 3 mm. long. Fruit globose, 2 cm. in diameter, strawberry red, with numerous scales and dense, short, brownish white hairs. Seeds black, oblong, 1 mm. long glossy.

Bolivia. Provincia de Tarata. Departamento de Cochabamba. La Angostura, 2570 m. *M. Cárdenas* 4820a, Enero de 1948.

This new variety differs from the typical species in having only one central spine, all the spines straw-yellow colored, longer flowers, a rose-purple ovary and tube and longer dark green outer perianth-segments.

Cleistocactus parapetiensis sp. nov.

Columnaris, non ramosus, 60-70 cm. altus. Caulis 4 cm. diam., herbaceo viridis. Costis 19, 4 mm. altis, 5 mm. latis. Areolis 5 mm. inter se distantibus, cinereo bruneis vel cinereo albidis tomentosis, 2 mm. diam., ellipticis, prominentibus. Aculeis plus minusve 20, acicularis, 3-10 mm. long. alii albis, alii bruneis. Flores ex tertia apice caulorum, tubulosis, fere incurvatis supra ovarium, 3-3.5 cm. long. Ovario globoso, aliquid compplanato, 6 mm. long., squamis carnosus, latis, atro purpureis, apice albidis, denso pilis brevis, albis praedito. Tubo fragare rubo, parce squamoso et piloso. Phylla perigoni, lanceolata, 5 mm. long., flavo viridia. Stamina duplici seriali inserta, inferne 2 cm. long., superne 8 mm. long; filamentis albis, antherae longae compplanatae, purpurae. Stylo 2.8 cm. long., albo, 6 ramis stigmaticis, crassis, smaragdo viridis coronato. Fructo globoso fere sicco, parvo, 1 cm. diam. vel minus, purpureo brunei, parce squamoso et piloso. Semina parva, 1 mm. long., minute striata, atro brunea nitentia.

Plants columnar, not branched, 60 to 70 cm. tall. Stems about 4 cm. in diameter, tapering, fresh-green. Ribs 19, low, 4 mm. high, 5 mm. broad with transverse furrows. Areoles 5 mm. apart, upper ones brownish gray felted, lower areoles with whitish gray felt; all areoles broadly elliptic, 2 mm. in diameter, prominent. Spines about 20, uneven, shortest ones 3 mm. long, middle ones 6 mm., longest 10 mm. long, acicular, some thicker and some thinner, hair-like, some white, some brown. Top of stems covered by dense soft spines. Flowers produced from near top of stems to nearly 30 cm. down its length, tubular 3 to 3.5 cm. long, 6 to 7 mm. broad, slightly bent above the ovary. Ovary globose, slightly flattened, 6 mm. long, with broad, dark purple, fleshy, whitish tipped scales which bear dense short white hairs. Tube 2.5 cm. long, strawberry-red with a few fleshy green-

tipped scales and a few short white hairs. Perianth segments greenish-yellow, outer ones with a pink base, lanceolate, acute, 5 mm. long. Stamens in two rows; lower ones from above nectar cavity, 2 cm. long, with white filaments and long, flattened, purple anthers; upper stamens 8 mm. long with filaments white below, pinkish above. Style 2.8 cm. long, slightly thickened, white. Stigma rays 6, thick, 3 mm. long, emerald-green. Fruit globose, narrowly truncate above, 1 cm. in diameter or less, purple brown with few darker, light pink tipped scales which bear a few white hairs, almost dry, opening from above. Seeds 1 mm. long, finely striate and pitted, dark brown, glossy.

Bolivia. Provincia de Cordillera. Departamento de Canta Cruz. Carretera Camiri-Charagua, 900 m. Marzo de 1949. *A. Corro s. n.* (TYPE) (*Herbarium Cardenasianum 4821*). Cotype in U. S. National Herbarium.

This species shows no relationship with other known *Cleistocactus*. It roughly suggests *Cleistocactus smaragdiflorus* by the color of its flowers, but differs by its thicker stems, shorter and denser white or brown spines, the shorter and rather curved flowers, and the minute fruit.

The specific name *parapitiensis* comes from the Parapeti River valley, where this cactus has been found. The plants flower during the entire year in cultivation and are self fertile.

FIG. 124
Cleistocactus parapetiensis Cárdenas, sp. nox. x cm. rule in photo.

FIG. 123
Cleistocactus parapetiensis Cárdenas, sp. nov. Approx. x 0.2

Obs. It is interesting to observe the variation of the flower color in the various *Cleistocactus* species. This ranges between red, yellow and green in various combinations and seems to be dependent upon a few genes. The most striking case is that of *Cleistocactus tominensis*, a little-known species from Chuquisaca (Bolivia), which shows at times, on the same branch, red, yellow and green flowers. The genetic behaviour of the genus *Cleistocactus* should prove worthwhile for future investigation.

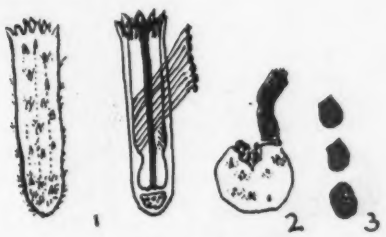


FIG. 125
Cleistocactus parapetiensis Cárdenas, sp. nov. 1, Flower, x 1; 2, Fruit, x 1; 3, Seeds, x 5.

Lobivia caineana sp. nov.

Simplex, elliptica, parce apice umbilicata, intense viridis, non nitens, 10-20 cm. alta, 7-9 cm. lata. Costis 9, sursum valde elevatis, decorsum dilatatis, 1.5 cm. altis, 2 cm. latis. Areolis 2.5 cm. spatio separatis, ellipticis, 1 cm. diam., superne lutei, inferne cinerei tomentosis. Aculeis 14-18, subulatis, incurvatis, albo cinereis, 1.5-7 cm. long., longiores superne incurvatis. Flores ex apice caule, 5-7 cm. long., infundibuliformi. Ovario globoso, 1.5 cm. diam., squamis carnosis, brevibus, latis, viridibus, apice acuto mucronatis, pilis albis, longis, copiosis praedito. Tubo 2-3 cm. long., superne patens, squamis carnosis, 5 mm. long., acutis, viridibus, roseo mucronatis instructo. Phylla perigoni exteriora 2-3.5 cm. long., lanceolata, acuta, temperato viridia; interiora late spathulata, 2.5-3.5 cm. long., rosea, magentia mucronatis. Stamina duplici serialis; inferiora 2 cm. long., superiora 1.5 cm. long; filamentis albis, tenuis, antherae temperato flavae. Stylo 2.5-4 cm. long., albo, non exserto. Ramis stigmaticis plus minusve 9, filiformis, diluto flavis. Fructo ovoide, 2 cm. long., squamoso, piloso. Semina 1.2 mm. long., opace nigra, truncata.

Hab. In petrosis aridis.

FIG. 126
Lobivit caineana Cárdenas, sp. nov. x 0.3

Simple, ellipsoid, slightly umbilicate, 10 to 29 cm. high, 7 to 9 cm. broad, fresh green. Ribs 9, prominent above, blunt below, 1.5 cm. high, 2 cm. broad. Areoles 2.5 cm. apart, elliptic, 1 cm. in diameter, upper ones cream felted, lower ones with gray felt. Spines 14 to 18, subulate, not differentiated into radials and centrals, curved, uneven, shortest 1.5 cm. long, middle ones 2 to 2.5 cm., the longest 4 to 7 cm.; medium spines laterally spreading, longest ones directed upwards; all spines gray colored, except the top ones which are whitish, brown tipped and 1 to 2 cm. long. Flowers from the top of the stems (unusual in this genus), 3 to 4 in number, funnelform, 5 to 7 cm. long, 4 to 6 cm. wide on limb, diurnal. Ovary globose, 1.5 cm. in diameter with short, broad, fleshy green scales ending in a whitish brown mucro and bearing dense, long, white hairs. Tube 2 to 3 cm. long, furnished with 5 mm. long, acute, fleshy, green, pinkish tipped scales which bear white hairs; interior surface of tube white. Outer perianth segments 2 to 3.5 cm. long, lanceolate, acute, light green; inner segments broadly spathulate, 2.5 to 3.5 cm. long, pink, magenta, mucronate. Stamens in two rows; lower ones about 2 cm. long, upper ones 1.5 cm.; filaments thin, white, anthers light yellow. Style 2.5 to 4 cm. long, white, not surpassing the upper stamens. Stigma rays about 9, filiform, 5 mm. long, light yellow. Fruit about 2 cm. long, ovoid, with scales and white hairs, almost dry, few-seeded. Seeds 1.2 mm. long, black, pitted, with a broad hilum.

Bolivia. Provincia de Charcas. Departamen-

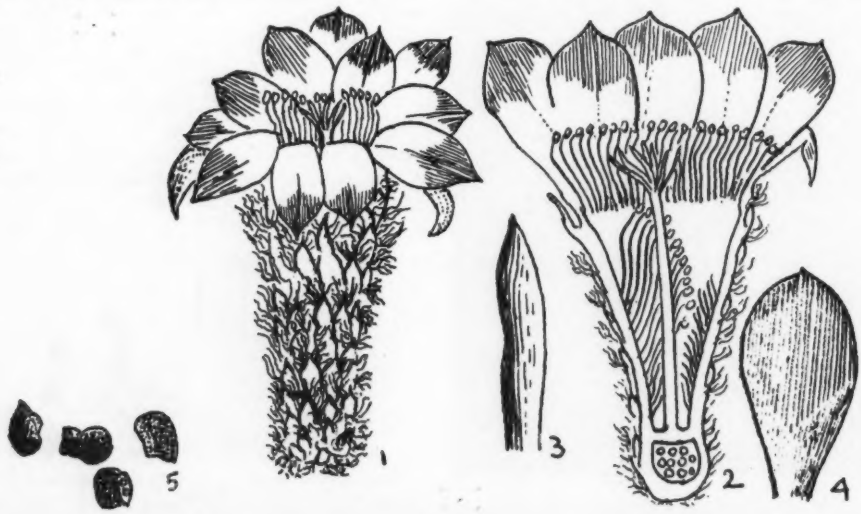


FIG. 127
Lobivia caineana Cárdenas, sp. nov. 1, Flower, x 1; 2, Flower section, x 1; 3, Outer perianth segment, x 1; 4, Inner perianth segment, x 1; 5, Seeds, x 6.

to de Potosí. Calahuta o Calaota sobre el Rio Caine, 2000 m. Octubre de 1950, *M. Cárdenas 4822* (TYPE), in Herbarium Cardenasianum. Cotype in U. S. National Herbarium.

This species has no relations with the species of *Lobivia* hitherto described. It is distinguished by its broad ribs, strong spines, and apical flowers as in *Parodia*.

The specific name comes from Rio Caine on whose borders occurs this curious plant.

FIG. 128
Anacampseros rhodesica grown in the open by the author. Approx. nat. size.

AN INTERESTING ANACAMPSEROS

I have been receiving issues of your periodical "Cactus and Succulent Journal" lately, and I want to inform you that I enjoy reading and studying the articles and photographs therein.

We have a fairly varied succulent flora in Southern Rhodesia. One of the most fascinating plants is *Anacampseros rhodesica* (Section Avonia). I would like you to publish the enclosed photograph in your JOURNAL. I am sure this rare little plant will prove to be of considerable interest.

The succulent tendencies are clearly illustrated by the tiny green leaves protruding above the pure white stipules. The colour of the flower is white with a very slight shade of pink, the ovary bright green, the five stamens yellow; altogether a lovely little bloom of simple construction. On this particular day seventeen buds opened in all their glory.

These buds remained open for one full day and in this respect *A. rhodesica* differs from most other species. South African relations bloom rather shyly roundabout 5 a.m. and then for about an hour and a half.

This specimen hails from the farm Shawanoja, District Marandellas where it grows in a peculiar fashion, true to tradition, on a small solid granite kopje (a small hill), sloping at an angle of 25°-30°. The annual summer rainfall there is 30 inches.

Under the unyielding forces of nature narrow cracks have formed in this rock. In these the runoff of the rainwater is extremely swift. The little pockets of soil which accumulate here is of a very fixed nature and not subject to erosion. Here the *Anacampseros* thrives. Otherwise, soil and gravel accumulate on small shallow patches and the larger specimens occur here. The drainage remains good. The colour of the granite gravel is similar to that of the *Anacampseros*. Another instance of remarkable mimicry!

Because of most excellent drainage conditions this member of a very succulent family is more at home in the hot arid South African semi-deserts and exists in this comparatively high rainfall area.

EMDEN A. PIENAAR.

MULCHING PRACTICES FOR CACTI AND SUCCULENTS

By HOWLAND ATWOOD

Like most easterners I have been experimenting with the various horticultural practices that I am familiar with, while in the process of being acclimated to western living.

However, I am more than pleased to note that at least one method I used back East will work out here—the maintenance of a mulch on flower beds or perennial and shrub borders. Mulches are entirely suitable in conjunction with the culture of cacti and succulents, especially with Aloes whose thick, stubby roots do not penetrate California soil easily, apparently due to its tendency, when drying, to become a reasonable fac-simile of concrete.

The first step in preparing to mulch is to spade over the ground, turning under what leaves or small weed plants may be there, in order to get the soil in as good condition as possible—to encourage the capillary rise of soil moisture and the entrance of air into the soil, so necessary to healthy growth of plants. Then break the clods by punching and smoothing them with a rake. It is not necessary to thoroughly rake the whole surface as is regularly done on a walk or a lawn seed bed, for it leaves the soil more attractive until the mulch is completed and the mulch will settle down better. It can be said further that a plant bed with undulating surface contours has a much more pleasing and naturalistic aspect than one that is everlastingly raked flat with every rake-tooth mark showing.

This ground spading process starts the action, for a loose soil—in addition to the organic matter turned under—enables the soil bacteria to work and attracts the earthworms. Earthworms are most valuable inhabitants of the soil. The soil particles continually pass through their system and are broken down so that the soil nutriment is more readily available to the plants and the little tunnels of the worms allow the necessary amount of air to enter the soil.

Now, spread lawn clippings, leaves or any material fit for the compost pile on the surface of the soil around the plants—*not on* them. Naturally, the size and nature of the plant determines the depth and quantity of the mulch. For example, the Mammillarias (the pin cushion cacti) and *Lophophora williamsii* (Peyote buttons) and other small or low growing plants would do best with a light or thin layer of mulch. Large aloes and large cacti would stand a heavy application. Plants that spread (ground covers) as Sedum, would not need a mulch except beyond the extremities of the plant. It is all a matter of using good judgment and common sense, coupled with expanding practical experience, which after all sums up gardening. When using green lawn clippings it is advisable to place them not over one inch deep at a time in order to avoid heating, souring and sloughing of such material. At home I start mulching the borders at one end of the property and by the time I get back to where I began, the first application has practically disappeared into the soil and more can be added. It is surprising how quickly the soil becomes bare again once the earthworms and bacterial action get started. This disappearance or utilization of the much is dependent on the amount of watering or irrigation that is done—a mulch naturally lasts longer on dry unwatered soil.

Some gardeners may believe that rotting leafmold or humus acts as glue in our California soil—that is, binds the soil particles closer together than ever. I do not believe this to be true. Underneath such plants, as an old clump of *Aloe brevifolia*, the soil may be found very friable, of a crumbly texture and porous, due to the disintegration of old leaves, stems and roots. Under shrubs that hug the ground closely, as *Parosela* (Dalea) *greggi*, the same conditions may be found—in fact they may be noted under any low branching shrub, tree or old perennial plant that covers the ground.

While on the subject of mulching materials, it might be well to consider peat moss, for its pro's and con's are often in horticultural limelight. First of all it is expensive. It is never found to my knowledge in the native habitats of cacti—where they thrive without it. Perhaps it would be a worthwhile project for experimentation, but better judgment would tend to rule it out, especially for cacti. There is a definite threat of its being too soggy in the winter months, even though it were well mixed into the soil. However, the acid content might prove beneficial in counteracting the alkali present in the water, which is fast ruining California's fertile soil.

There are many good results achieved from mulching, which it is well to note. A mulch keeps the soil cool, prevents baking of the soil surface, and saves a lot of water. It is much easier to water sloping ground because the mulch —especially if it consists of grass clippings or

other fine material—makes a continuous series of little dams that slow down the run-off, just as though it were a grassy slope or a forested hillside.

A good mulch eliminates much weeding. It hinders the germination of many weed seeds because the soil is too cool and if the weed seedlings do start many of them are shaded out. The extra moisture retained and the bactarial action no doubt takes care of a lot of weed seeds along with the other organic matter. If a weed does it have as extensive a root system due to as there is not a tight, hard soil holding it, nor does it have an extensive a root system due to the greater amount of moisture available.

A mulch neatly applied need not appear messy. It surely looks better than a water packed, bare soil, baked hard and full of cracks. It is about the same color as soil. After it has been practiced for awhile a mulched flower bed appears better than when first started. The leaves and material that is either coarse appearing or apt to blow about can be placed on the bottom next to the soil with the finer leaves or grass clippings on top. Soon after a mulch is started it will be noted that the plants begin to grow and expand towards each other and ultimately hide much of the soil surface from view. Think of a mulch as a carpet, if you like—the different types of leaves make up differing textures. It can even be quite interesting in itself.

Mulching materials can be added the year around, but after the first of November when rainy season starts it is well to let up applying the mulch around cacti and succulents and let the ground get somewhat bare during the winter months, as the sun warms the ground easier which is what they like in winter. Then about the first of March start mulching again. There is not usually much mulch material available during the winter months, but the excess amount can be put on the compost pile. If bean straw were available at that time of year it would be better to put it on in spring that it might get a chance to break down through the summer. This avoids the excessive rotting or sloughing that may result when bean straw is turned directly into the soil in large quantities. It is claimed that bean straw brings weed seeds, such as wild morning glory, into the garden because of the weed growth prevalent in bean fields. However, coarse material such as bean straw is very beneficial. It is advisable not to strew it wantonly on the plants, for the sake of appearance.

Organic materials from the plants themselves provide both mulch and fertilizer in their natural habitat, but when man undertakes to garden by continually trimming and shaping the plants —carrying away the trimmings and keeping the soil meticulously bare (such a lot of work), sooner or later the soil is going to run short of nutriment and the earthworms and soil bacteria will disappear, because they have little organic matter to feed on. It takes much longer to put back the necessary elements into the soil with a mulch of organic matter, once the soil has been robbed and depleted of its natural nutriment.

Immediate results cannot be seen, as from a "shot" of nitrate of soda. We can perhaps get the same elements back into the soil with chemical fertilizers, but it is such a strong dose to apply all at once that it virtually burns the life out of the soil. It is far better to maintain a steady mulch and if this had always been done the soil would have remained all right. Years ago I used chemical fertilizers entirely in my vegetable garden and the soil finally got so sterile, before I realized what was wrong, that one couldn't raise an umbrella on it as the old timers say. It took two or three years to bring that soil back to normalcy, or so it would again raise vegetables. Grass clippings are richer and return to the soil quicker than dead leaves, due to their being green when cut and their soft growth.

Plants are healthier when mulched and are more resistant to disease and insects. You may still be bothered with such pests after you mulch, but the plants and the soil are still sick. Some may feel that a mulch may add extra shelter to sow bugs and snails, but I have not found it so. Furthermore, the plants become more resistant to them, as a person in good health is more resistant to sickness and disease.

The plants becoming healthier are more resistant to cold. However, it is well to avoid transplanting in late fall—especially tender plants—as the plant's root system cannot get sufficiently established to get the extra nutriment it needs, hence its sap becomes more watery and dilute and the plant is more susceptible to freezing.

Stones are good to have in the soil, too, especially around cacti and succulents, (unless they are too plentiful, too large and cumbersome). They are cool and hold moisture during the summer and they retain warmth in winter—notice how a plant's roots always hug a nearby stone.

And what is cultivation but a mulch—of dust. One has to cultivate constantly to maintain a dust mulch, but a regular mulch can be applied leisurely whenever the material is available. Let's use our lawn clippings and leaves instead of paying to have them carted away. Why not save time and expense ordinarily involved in weeding and cultivation and slash the fertilizer costs?

FROM CANADA

Last week I received the booklet "The Cultivation of Succulents" by Jacobsen and in the same I am reading that seedlings which are transplanted into frames or flower pot should be kept at a temperature of 85-95° F. for about 10 days, till the plants begin to grow again.

Now, I feel sure that it is the temperature which has been at the base of all my troubles. When Luther Burbank stated that Cacti should only be transplanted during the 5 summer months, meaning May, June, July, August and September, I have a feeling that it may have also been the temperature which caused him trouble.

This would also explain the fact that some nurserymen are able to keep their cactus plants and succulents in their hothouses with much more moisture than seems reasonable. Most likely the plants get considerable heat at the same time.

As you know, I complained before that when I bought cacti and succulents with bare roots, and had to re-plant them, they did not seem to make new roots and after several months the plants would die. The very same happened to quite a number of plants which I had bought in the stores, in pots. They also lasted a few months and then they died. Most likely the nurseryman who had imported them from the South had not used the necessary care in re-planting them and took it for granted that his plants had made new roots.

And then, of course, certain plants have to be watched as to their growing season, as they will only make new growth during that period. I am very doubtful that this matter has received the necessary attention. In the southern parts of the U.S.A. this may not be of such great importance, since the temperature may go to 80 and over even in the midwinter, but in the temperate climates this is different.

When we acquire a new plant, cactus or succulent, it is supposed to be the right thing to do, to find out its correct name and then to learn how it has to be treated. This is the way as it is explained in the books about cactus culture, etc. How many people who buy a flower pot or rather a pot of flowers, or several of them, go to the trouble of buying a book on how to grow geraniums, petunias, etc.

When you are trying to identify your one cactus plant you may be in possession of $5.00 or $10.00 worth of cactus books and still not be able to do so because this particular picture is not contained in your books. For this reason and to facilitate the culture of succulents responsible growers should gradually be induced to strictly provide *all* their plants with identification tags, giving the name of the plants. It may cost a few cents to have such tags provided by this. It should become an established practice in the trade, that plants from reliable nurserymen should all have a good label with the name on it. In the course of time the label would become the trade mark of the grower and any plant with the tag of a reliable grower attached should be worth more money than run-of-the-mill plants.

Then it would be an easy matter for the purchaser to look up the name in the books and find out what kind of treatment the plants like in order to keep it alive and make it grow and produce flowers if at all possible. The growers could produce small but good-looking labels of light brass, or zinc, and they should not cost too much, if made in quantities. If such a measure could be adopted it would put cactus lore on an entirely new footing. If at present fans spend about half their time trying to find the correct name for their plants, in the future all this searching would be a waste of time, as *all respectable* plants would come with their correct name attached on a neat and smart label.

A. C. STADELMAN, Canada.

ROOT MEALY BUG

I am writing this letter to you with the hope that my experiences in dealing with an insect pest which I understand is very common in California, the "Root-Mealy Bug," may be of some aid to other cactus collectors who may be experiencing the same troubles I have had.

I have a greenhouse collection of around 700 cactus plants. About two years ago I apparently added some infested plants carelessly to my collection and in a relatively short time I experienced some severe losses among my plants before I was aware of the cause. Practically every plant had the roots heavily parasitised. At the time I had a considerable ant problem which I quickly controlled with "Chlordane" dust.

Immediately I tried all of the recommended treatments of the potted plants such as soaking the pots in a strong nicotine solution, solutions of various insecticides, and placing of Paradichlorbenzine crystals in the bottom of the pots. All of these treatments were ineffective over a period of several months and several plants were lost probably due to excessive soaking. The insects and their webbing were extremely resistant to wetting by the insecticides which probably accounted for my failure.

In desperation I turned to the more radical method of control which consisted of removal of the plants from the pots, washing off all soil from the roots, soaking the plants in a "Loro-Dupont" insecticide, boiling of pots, and repotting with new sterilized soil. This method I had avoided because of the time and labor involved.

My ant problem was completely eliminated and I presumed that my troubles were over. In about three months I noted that several of my plants were not doing well and I removed them from the pots to examine the roots and I discovered that I again had a heavy infestation of Root-Mealy bugs. Apparently the bugs will travel from pot to pot without ants to transport them. As the growing season was over I did not wish to repot the entire collection so I just repotted the surrounding pots. Apparently due to the time involved in my original repotting some the repotted plants were reinfested before the task was completed.

In March, 1952, (the following spring) practically the entire collection was again infested. I took my problem to the Experiment Station of the Ohio Dept. of Agriculture. This parasite had previously been unknown to them but they suggested the use of a highly poisonous contact and fumigant insecticide.

This product is 15% Wettable Parathion produced by the Dow Chemical Co. The pots were soaked in a solution of 10 grams (approx. 3 teasp.) to 1 gallon of water. One soaking proved to be effective on control plants, however several applications were used. In no case was there any evidence of the product being toxic to the plants or roots. For 5 months now I have been unable to find any reoccurrence of the infestation. This product is highly toxic and should be used with extreme care and should only be handled with rubber gloves.

I hope that my trouble with this insect is over permanently and hereafter I will be doubly careful of any new plants.

P. R. CARPENTER, Kent, Ohio.

EDITOR'S NOTE: Because of the many dangers in using Parathion, this product is forbidden to be sold or used by private gardens in California. Anyone using this poison should do so with extreme care.

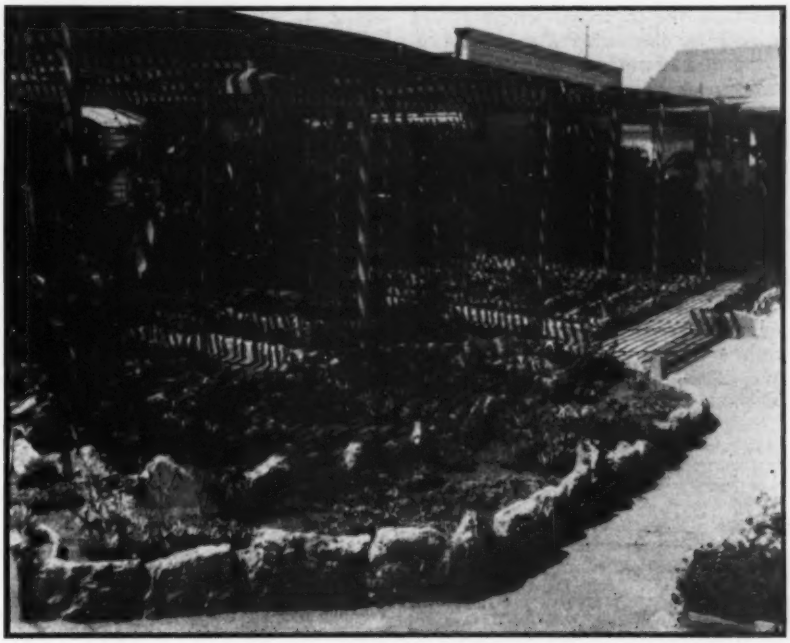


FIG. 129. A view of the Rush garden.

AN OUT-DOOR GARDEN

In Southern California, the most visited amateur garden of cacti and other succulents is that of Homer and Ethel Rush. Not only is their garden one most visited by succulent plant fanciers, but these two find themselves amongst those most sought after in the succulent world; they are a source of a wealth of information on these plants. Their home has hosted most of the important people in the world of succulent knowledge.

One enters the main part of their garden through the patio, where the sight that first greets the eyes is a beautiful potted specimen of *Kalanchoe beharensis*. Many other succulent plants in pots line the patio wall and the opening to a short section of lawn. Bordering the lawn and extending to the rear of their property is one huge bed of many species of cacti. We follow the path and find that the beds of fine specimens are many, covering the entire rear part of their grounds with winding, rock bordered paths wandering and mingling from one interesting part of the garden to another.

The first planting is entirely of many, many rare species of specimen Sempervivums, Ethel Rush's present specialty. Each species of this multitudinous collection has an individually designed 'mesa', boxed in by rock work to prevent confusion from straying. Across the path from this hill of Sempervivums is a larger bed, arranged with its individually marked off areas where are planted many more species of Sempervivums as well as a number of Homer's Kalanchoes, many of which are imports and have been results of long and arduous bargaining.

The Sedums claim their share of the next rock lined bed although there are other speciments of succulent plants. A tiny path cuts across this bed and back into a lath section that houses a collection of potted Echeverias, displayed on stair steps built in a "U" shape.

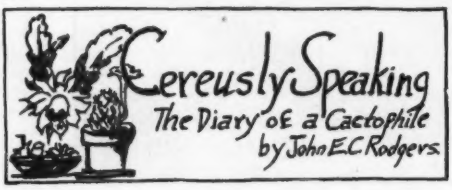
We return to the main path and continue on to view a planting of a great variety of succulents, primarily Echeverias. As we near the end of this beautiful planting, we round the path to view Dudleya Hill. Here, planted on a steeper slope than the other plantings and built high with rock work, is a large planting of the many species of Dudleya and Stylophyllum that the Rushes have searched the Southland for.

As we follow the path that returns to the lawn, we note for the reader that about two-thirds of the area of this xerophytic garden is planted to succulents other than cacti and is shielded by an overhead protection of lath. While the cacti are planted in a huge bed in the full sun. In addition there is a small glasshouse for winter protection of the few plants or cuttings that might need such, as well as a potting and propagating section.

This is a garden that is not only horticulturally but scientifically valuable, as each plant is labeled and the Rushes have a world of plant information that they freely share.

It is truly a treat to meet at the garden of Homer and Ethel Rush and here is something wonderful to see at the Convention in '53.

MACE E. TAYLOR.



Most plants bloom when they are old enough. Although I have 5 cacti I bought 10 years ago as blooming size that I've known people that had only an Echinopsis and Epiphyllum Ackermannii or Epi. Deutches-Kaiserin and both bloomed each year—100%. What Luck?!

The blooming question has most cactophiles guessing. There are several reasons why they don't outside of being too young. Some are "shy bloomers" in the wild so cannot be expected to improve under artificial conditions. Most plants are kept too moist and warm during their resting period, so do not form buds. [Any species that has to struggle against overpowering odds usually reproduces rapidly.] Some come from the equatorial zone where there is more light the year around. Some resent the use of acid soils, others alkaline soils. Some like moist feet while growing, others like absolutely dry feet or very little moisture.

Some genera do not require the same soil for all species. *Gymnocalycium mihanovichii* likes an acid soil while the others seem to do best in a neutral or slightly limey soil. *Astrophytum asterias* demands closer attention to soils than the others or it is sickly but all like good drainage.

In fact I'm almost hesitant to tell a friend that his well-grown plant is a cactus or other succulent because he immediately becomes panicky and insists it must be replanted in pure sand. Then it would also receive the other "killer treatment," a tablespoon of water each week. These two ideas (pure sand and very little water) are the hardest of the misinformation about cacti and succulent to correct. Cacti need water when growing; use enough at least once a week for most species so that it runs out through the drainage hole. The soil should be rich and loose (coarse sandy-gravelly-leafmold-loam) with lime for heavy spiny types and very little if any for the Epiphytes. Starvation is just as apt to cause the loss of a plant as overwatering. After a plant has bloomed, it should be fed and given the best attention possible as it is also setting buds for next year on that beautiful new growth.

After a plant has reached maturity it will be able to stand less food. The "average collector" seldom has a mature plant in his collection. I have a few—*Leuchtenbergia principis, Lophophora williamsii, Strombocactus disciformis, Ariocarpus fissuratus,* and a few succulents.

The age of a plant cannot be told by the cactophile unless he knows its past history. It may have been grown rapidly. Watson mentions some European growers make a cold frame, then put in a foot of manure, cover it with 6 inches of good, rich soil. When the temperature stays around 70°, the seedlings are set into the soil. Growth is rapid. The plants are hardened off and sold in the fall. On the other hand it may have been collected in the wild "without the benefits of man." I've a 25 year old *Astrophytum ornatum* and *Hamatocactus hamatus* which are over a foot high and 15 inches in circumference. I've some runts 20 years old which are 6 inches high and 10 inches around. Smaller pots when transplanted and fewer repottings with more sand, less soil and leaf-mold or just the Mendelian theory is working—are a few of the reasons.

I also have 17 five year *Astrophytum myriostigma* which are the same age, the variations are few, the size uniform. They were given to me by a Dutch grower near here. He insists that the cold-frame idea mentioned by Watson is one of the best methods to insure uniformity he knows. I keep the plant he gave me separate and water sparingly while stored cool. His plants "take it" fine. I begin watering "heavily" in late April when growth begins. By August the peak of growth and blooms is past and one can then begin deciding which plants need what. I do my cactus work when it is convenient, which is not always "orthodox" according to most systems.

I've found a plant unpotted through an accident does as well as others even if the accident happened in the fall or in the spring, and is repotted. I do not advocate accidents, but some plants I've been afraid to repot did, by accident, get repotted. It worked so well that I now imagine the accident and repot when I feel like it. Root disturbance should be held to a minimum in the "imagined accidents." Firm the soil about the roots, a light sprinkling and partial shade were all the allies I needed.

The fall potting program (spree) for those who set their plants directly in the soil begins by the middle of August if there is a large collection and late August for others. I never "de-pot" my collection as I feel that too much disturbance at this time injures the roots which must then be shortened, the plant roots dried for several days before repotting them after the rampaging growth of summer unhampered by a frost.

By the middle of July the last fertilizer should have been given so that the plant can slow down before window sill, greenhouse or storage room conditions are to be encountered. Those who follow my column know I'm just ahead of the first frost or snowstorm in October. The wild geese usually are my barometer-thermometer. The greenhouse is so full (bench, floor, under bench, storage room, etc.) at this time I usually close the door and leave them cold. A warm day encourages me to open the door, set the plant out and they have done best in the past.

The indoor pests disappear during the outside growing period but the outside pests come in when storage begins: aphids, grasshopper and cricket eggs in pots, spiders, etc., if I do not check before I get them placed for winter. The catbirds, wrens, creepers and the insects "pill bugs," wasps, crickets, centipedes, milli-

peds, etc., have gotten rid of spine bugs, mealy bugs, scale, and thrip. The ants are the only ones I do not like around my plants but even they indicate root bugs, etc. I do not use D.D.T. in my greenhouse nor on my plants as I have built up a legion of insect friends there that I do not wish to kill off. There are plenty of sprays I do use.

I agree with that cactophile of cactophiles, Harry Johnson, in his column that one must buy named plants from reputable dealers if he is to know what he has. To find, for example, the name of an unnamed Mammillaria (after seeing it bloom et al) is a tedious job. I usually look at the pictures first and mark down similarities to the one I wish to name then read the unpictured ones' descriptions, look at my friends named ones— the plant invariably remains unnamed (because I'm too lazy to go on).

I own Britton and Rose, Marshall and Bock, Mammillaria monographs, etc., but I still prefer to read descriptions of named plants. I read about the Stapelias, Euphorbias, Epiphyllums in my special books to check on the names, synonyms, etc., of the plants I own. I still "buy the named ones." Some say names don't mean much but I'm sure the interested person will soon become name conscious just as he does with the people he meets.

The members of our Midwest Cactus and Succulent Society (organized July, 1936) attend exhibits, collections, etc., and invariably wish to have plants identified by name. The public that attend our exhibits are also name conscious (gardeners are) the two most asked questions are: "What is the name of this" and "Where does it grow?" with "What kind of soil does it take as a close third?"

The summer heat is either at its peak here in September or an early winter is to descend in October (last two years) but whatever the weather my cacti and other succulents are the most interesting group of plants that I work with whether outside, in storage, on window sill or in the greenhouse.

JOHN E. RODGERS,
1229—8th Street, Lorain, Ohio

QUESTION AND ANSWER COLUMN

By HARRY JOHNSON

Question: I have a general collection of small cacti and succulents. All are watered at the same time and quite freely during the summer. Two mammillarias rotted while the other plants seem healthy. Why should they rot and not the others? Do Mam's require segregation with different water requirements.—C. B. M., Vt.

Answer: Mammillarias of most species are reasonably tolerant of over-watering. However, one is courting disaster by freely watering almost any cactus even during the summer. There is nothing gained even if the plant is making lush growth. Few cacti will do much in the way of flowering if grown too fast. Seldom will they produce a normal development of spines and generally lose their specific characteristic growth forms. Understandably one does get impatient if his plants seem to be standing still for what appears to be most of the year but this is the nature of desert plants. I have several hundred thousand Mammillarias and seldom lose plants from rotting. They are always allowed to get dry between waterings. They are never soaked but given enough to last about a week in very hot weather. In late summer and fall the larger plants get less water.

Question: I see that recent writers for the Journal do not agree on whether cacti on the window sill should be turned to give all sides a share of the sunlight. If you expect flowers should they be turned.—Mrs. Cox, T. H.

Answer: Frankly, turning them will not make them bloom if other conditions and your culture are not right. If the only source of light is a small window, turning would certainly be in order or the plants would bend toward the light and grow out of shape. In a well lighted window it is of less importance. If your plant had not been turned and was suddenly turned on a bright summer day it could easily receive a bad sun scald. Strangely those plants from the driest, hottest deserts such as Ferocactus are the most susceptible to sun scald. If you want to turn your plants it may help where lighting conditions are not too good. However, a few plants such as some Notocactus normally grow off center and turning is not likely to remedy it.

"Give your cacti plenty of sun and air"—From *Punch.*

FROM MEXICO

My new Cacti Price List of 1952 has just been finished. It contains a good number of new discoveries. If you really are interested in rare Cacti, just write for my list to:

FRITZ SCHWARZ

Apartado 347 San Luis Potosi, SLP Mexico

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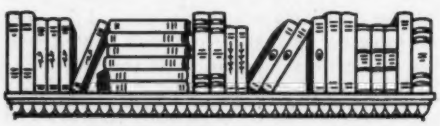

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUESTED BY THE ACT OF CONGRESS OF AUGUST 24, 1912. Of Cactus and Succulent Journal, published bi-monthly at Pasadena, for October, 1950. State of California, County of Los Angeles.

Before me, a notary in and for the State and county aforesaid, personally appeared Scott E. Haselton, who, having been duly sworn according to law, deposes and says that he is the Editor-Publisher of the CACTUS AND SUCCULENT JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Scott E. Haselton, Box 101, Pasadena.

2. That the owner is: CACTUS AND SUCCULENT SOCIETY OF AMERICA, INC.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. Cactus and Succulent Society is a nonprofit organization and issues no stock.

SCOTT E. HASELTON.

Sworn to and subscribed before me this 1st day of October, 1952—S. L. Bierbauer, *Notary.*

EDITOR'S NOTE

We are indeed sorry that we could delay publication no longer waiting for the next installment of Peruvian Cacti and Spine Chats. Readers will miss both of these features and we can look forward to them in the January issue.

INDEX AND BINDING 1952 JOURNALS

The index for 1952, Vol. XXIV, will be included in the January issue, 1953. We will bind JOURNALS at the end of 1953 which concludes the *first* twenty-five years of the JOURNAL.

CORRECTION

Please change the figure numbers in Vol. XXIV, No. 5, as follows: Change Fig. 77 to Fig. 99; Fig. 78 to Fig. 100; Fig. 79 to Fig. 101; Fig. 80 to Fig. 102; Fig. 81 to Fig. 103; Fig. 82 to Fig 104; Fig. 83 to Fig. 105; Fig. 84 to Fig. 106; Fig. 85 to Fig. 107.

Members in the vicinity of Fresno, California, should contact Vic Asadourian, 1231 Blackstone Ave., Fresno, California.

R. E. WILLIS DIES

Our Society's first secretary and the second president died in Los Angeles last month. Mr. Willis was a charter member and one of the two who organized the Society twenty-five years ago. He has not been active in the study of cacti for some years but has always maintained his loyalty to his old friends by keeping up his membership. We hope that someday we will have cactophiles with the vision and enthusiasm of R. E. Willis.

PROCTOR'S PICTURES

The February, 1953, issue of *The Arizona Highways Magazine* will be a big cactus number with 14 color pictures of cacti besides Kodachromes of other photographers. This is another of the cactus issues that Society members should be sure to add to their libraries.